In re: Chrysler-Dodge-Jeep Ecodiesel Marketing, Sales Practices, and Products Liability Litigation, No. 3:17-md-02777 (N.D. Cal.)

PEMS Summary Report
Pursuant to Paragraph 59.e of the Consent Decree

February 28, 2020

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I. Background

On January 10, 2019, FCA US LLC ("FCA"), Fiat Chrysler Automobiles N.V., V.M. Motori S.P.A., and V.M. North America, Inc. (collectively, the "Defendants") entered into a consent decree with the United States, acting on behalf of the U.S. Environmental Protection Agency ("EPA"), and the State of California, acting by and through the California Air Resources Board ("CARB") and the California Attorney General, related to model year ("MY") 2014 to 2016 Ram 1500 and MY 2014 to 2016 Jeep Grand Cherokee vehicles equipped with 3.0 liter ECODIESEL engines ("Subject Vehicles"). The Court granted final approval of the Consent Decree on May 3, 2019, *In re: Chrysler-Dodge-Jeep EcoDiesel Marketing, Sales Practices, and Products Liability Litigation*, No. 3:17-md-02777 (N.D. Cal. May 3, 2019), ECF No. 562 ("Consent Decree").

On September 3, 2019, FCA submitted a plan for portable emissions measurement system ("PEMS") testing to the EPA and CARB for review and approval. Consent Decree ¶ 59.d. After feedback and consultation, EPA and CARB approved the PEMS test plan. Accordingly, Paragraph 59.e of the Consent Decree requires that Defendants submit a Summary Report to EPA and CARB for each model year for testing performed under Paragraph 59.a. FCA submits this Summary Report of PEMS testing pursuant to Paragraph 59.a for MY 2019. FCA will post the Summary Report, redacted as appropriate, according to Paragraphs 59.e and 78 of the Consent Decree. As stated in Paragraph 59.h, "[t]he Parties agree and acknowledge that neither United States nor California law sets forth a standard by which PEMS testing can be used to determine compliance for purposes of certification under Title II of the Clean Air Act."

A separate Summary Report for testing pursuant to Paragraph 59.b for MY 2019 will be provided by FCA's Independent Third-Party Emissions Tester, Sensors Inc.

Pursuant to 40 C.F.R. Part 2, subpart B, Cal. Gov't Code § 6254.7(d), and Paragraph 119 of the Consent Decree, FCA requests confidential treatment of this submission.

II. Executive Summary

Paragraph 59.a requires that Defendants perform PEMS testing on vehicles from certain test groups selected to cover, in the aggregate, the full range of configurations of emission control systems on light-duty vehicles for MY 2019 Ram and Jeep brands. During Q4 2019, FCA's Paragraph 59.a PEMS testing was performed at its Chelsea Proving Grounds ("CPG") in Chelsea, Michigan, under real-world driving conditions over a range of ambient temperatures and pressures. As required by Paragraph 59.c.ii, FCA measured the following five constituents: oxides of nitrogen ("NOx"), total hydrocarbons ("THC"), non-methane hydrocarbons ("NMHC"), carbon monoxide ("CO"), and carbon dioxide ("CO2").

FCA performed PEMS testing on vehicles from fourteen test groups. For each selected vehicle, FCA completed: (1) Steady State PEMS Test (stepped nine-bag); (2) Transient PEMS test; and (3) as requested by EPA and CARB, an 80 MPH Steady State Cruise PEMS Test. The Steady State PEMS Test and the 80 MPH Steady State Cruise PEMS Test were run on FCA's oval track at CPG. The Transient PEMS test comprised of three cycle routes. Each Transient PEMS

test cycle route was designed to ensure a mix of endurance, speed, grade, key off and on, and stops to simulate real-world driving conditions.

FCA used PEMS units manufactured by Sensors, Inc. FCA performed weekly correlation testing on each PEMS unit and installed each unit according to the manufacturer's guidelines.

FCA prepared for and conducted the PEMS testing according to test methods recorded before the testing commenced. FCA collected and processed the emission data pursuant to Paragraph 59.g and FCA's approved PEMS Test Plan. Additionally, as requested by the Agencies, FCA provides to the Agencies cumulative NOx (g) data as a calculated signal from the second-by-second PEMS data for Paragraph 59.a PEMS testing. Further, relative to all of the second-by-second data for all (available) vehicle, engine, and PEMS parameters identified in Figure 3 below, FCA collected data for Paragraph 59.a. PEMS testing for the entire Steady State PEMS test, 80 MPH Steady State test, and the Transient PEMS test, including the transient portions of the Steady State PEMS test and the 80 MPH Steady State test. As agreed by the Agencies, FCA post-processed the Steady State PEMS test data and the 80 MPH Steady State test data to remove the transient portions from the averages calculated of the constituent pollutants. As further requested by the Agencies, FCA recorded Engine Coolant Temperature and EGR related OBD PIDS (if equipped) for gasoline and diesel vehicles for Paragraph 59.a PEMS testing.

The following Summary Report provides test results and additional detail describing all test methods used for FCA's MY 2019 PEMS testing pursuant to Paragraph 59.a of the Consent Decree.

III. Paragraph 59.a Testing

1. Model Year 2019 Test Groups

FCA selected fourteen test groups to satisfy the requirements under Paragraphs 59.a of the Consent Decree. Paragraph 59.a requires PEMS testing of MY 2019 light-duty motor vehicles for Ram and Jeep brands only. The Paragraph 59.a test groups were selected to cover, in the aggregate, the full range of emission control systems on those light-duty Ram and Jeep brand test groups. FCA lists its MY 2019 Paragraph 59.a Test Groups in Figure 1 below.

Light Duty Test Groups Containing								
	19MY Test Group	Engine	Transmission(s)	Driveline(s)	Fuel Type	Air System	Fuel System	Emission Standard
1	KCRXT01.35P0	1.3L	ZF 9 Speed	FWD, AWD, ESS	Gasoline	Turbocharged	Direct Injection	BIN 50, ULEV 50
2	KCRXT02.05P0	2.0L	ZF 9 Speed	FWD, AWD, 4WD, ESS	Gasoline	Turbocharged	Direct Injection	BIN 70, ULEV 70
3	KCRXT02.05P1	2.0L	ZF 8 Speed	4WD, BSG	Gasoline	Turbocharged	Direct Injection	BIN 85 CCV
4	KCRXT02.45P1	2.4L	ZF 9 Speed	FWD, AWD, ESS	Gasoline	Naturally Aspirated - Multi-Air	Port Injection	BIN 110 CCV
5	KCRXT02.45P4	2.4L	ZF 9 Speed, Aisin 6 Speed	FWD, AWD, ESS	Gasoline	Naturally Aspirated - Multi-Air	Port Injection	BIN 70, ULEV70
6	KCRXT03.05PV	3.0L	ZF 8 Speed	RWD, 4WD, AWD	Diesel	Turbocharged	Direct Injection	BIN 160, LEV II
7	KCRXT03.25P0	3.2L	ZF 9 Speed	FWD, AWD, 4WD, ESS	Gasoline	Naturally Aspirated	Port Injection	BIN 70, ULEV 70
8	KCRXT03.65P0	3.6L	ZF 8 Speed, Manual 6 Speed	RWD, AWD, ESS, 4WD	Gasoline	Naturally Aspirated - 2 Step Lift	Port Injection	BIN 70, ULEV 70
9	KCRXT03.65P7	3.6L	ZF 8 Speed	RWD, 4WD, BSG	Gasoline	Naturally Aspirated - 2 Step Lift	Port Injection	BIN 70, ULEV 70
10	KCRXT03.65PA	3.6L	ZF 8 Speed	RWD, 4WD	Gasoline FFV	Naturally Aspirated	Port Injection	BIN 110 CCV
11	KCRXT05.75P0	5.7L	ZF 8 Speed	RWD, 4WD	Gasoline	Naturally Aspirated	Port Injection	BIN 70, ULEV 70
12	KCRXT05.75P1	5.7L	ZF 8 Speed	RWD, 4WD, BSG	Gasoline	Naturally Aspirated	Port Injection	BIN 70, ULEV 70
13	KCRXT05.75P2	5.7L	ZF 8 Speed, FCA 6 Speed	RWD, 4WD, AWD	Gasoline	Naturally Aspirated	Port Injection	BIN 110 CCV
14	KCRXT06.25P1	6.2L	ZF 8 Speed	AWD	Gasoline	Supercharged	Port Injection	BIN 160, LEV II

Figure 1 – MY 2019 Selected Test Groups

2. PEMS Test Routes

FCA performed PEMS testing on private roads at CPG. For each selected vehicle, FCA completed: (1) Steady State PEMS Test (stepped nine-bag); (2) Transient PEMS test; and (3) as requested by EPA and CARB, an 80 MPH Steady State Cruise PEMS Test. FCA's Steady State and Transient PEMS routes provided for a range of ambient temperatures and pressures, including conditions not represented on the Federal Test Procedure. Ambient pressures varied depending on elevation at a specific track location and weather conditions. Ambient temperatures varied depending on time of day and weather conditions. FCA performed testing within ambient temperature limits of the PEMS unit provided by the manufacturer and under road conditions to ensure driver safety.

a. Steady State PEMS Test

The Steady State PEMS test is a stepped nine-bag vehicle speed test. The speeds range from 30 to 85 MPH in the following sequence: 30, 50, 60, 65, 70, 65, 75, 80, 85 MPH. Each speed state is held for approximately 600 seconds. The total test is approximately 5400 seconds long without key off or stopping. The Steady State PEMS test was run on FCA's oval track at CPG.

b. 80 MPH Steady State Cruise PEMS Test

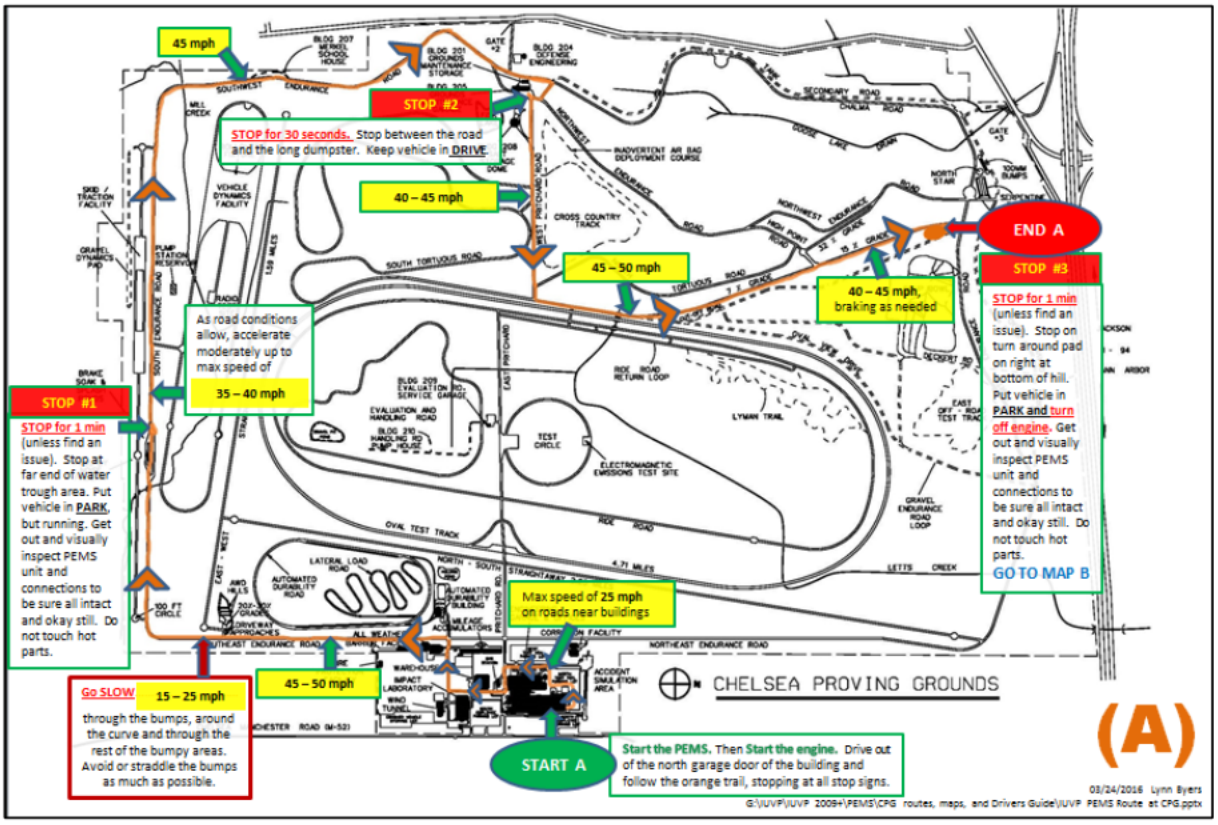
To accommodate the Agencies' request, FCA performed a 45-minute 80 MPH Steady State Cruise test without key-off or stopping. This 80 MPH Steady State Cruise PEMS test was run on FCA's oval track at CPG.

Figure 2 – FCA's Chelsea Proving Grounds

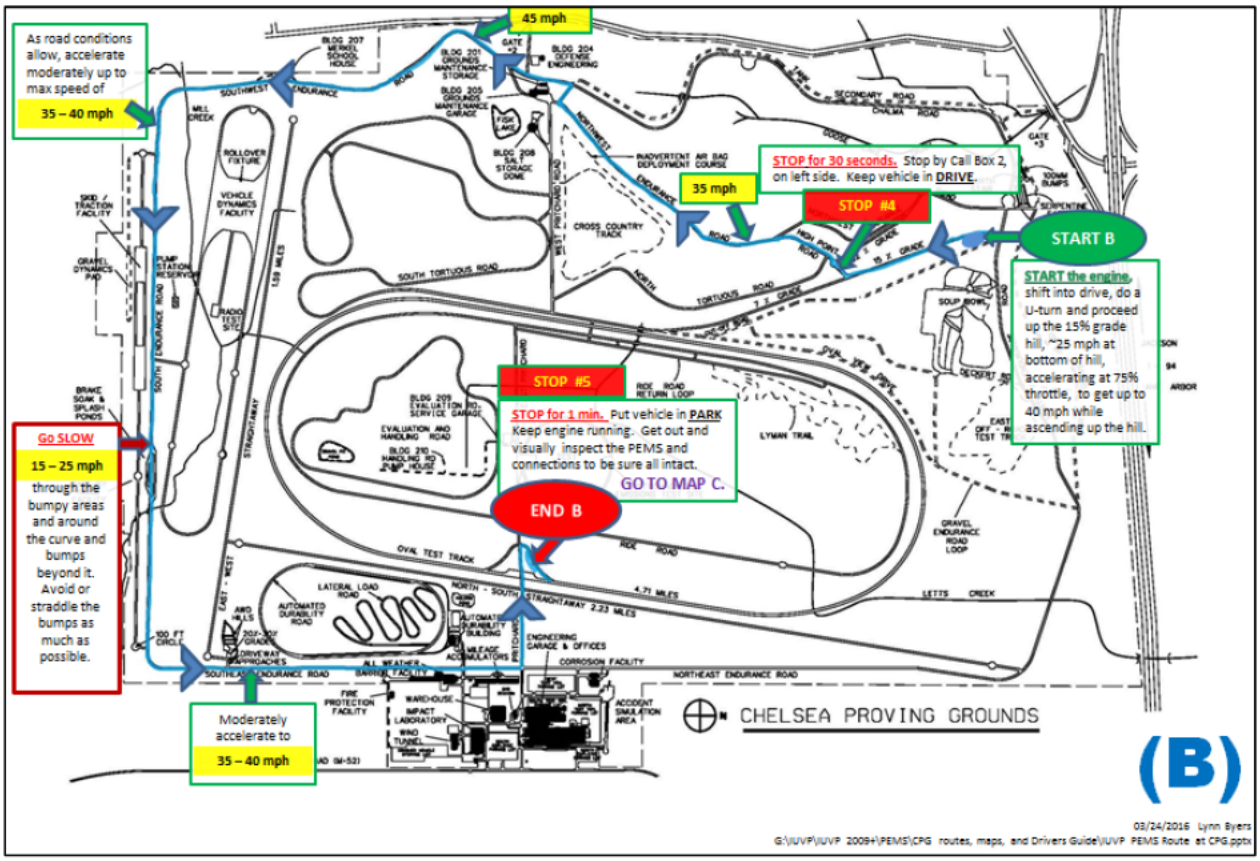
c. Transient Cycle Test

The Transient Cycle route was designed to ensure that there was a mix of endurance, speed, grades and key stops off and on to simulate real world driving conditions. The Transient PEMS test comprised of three portions (outbound, inbound, and oval/end of route) with six total stops, including engine off, and varying gear states. Speeds range from 0-80 MPH. There are varying grades, undulating and curved roads, and highway driving conditions.

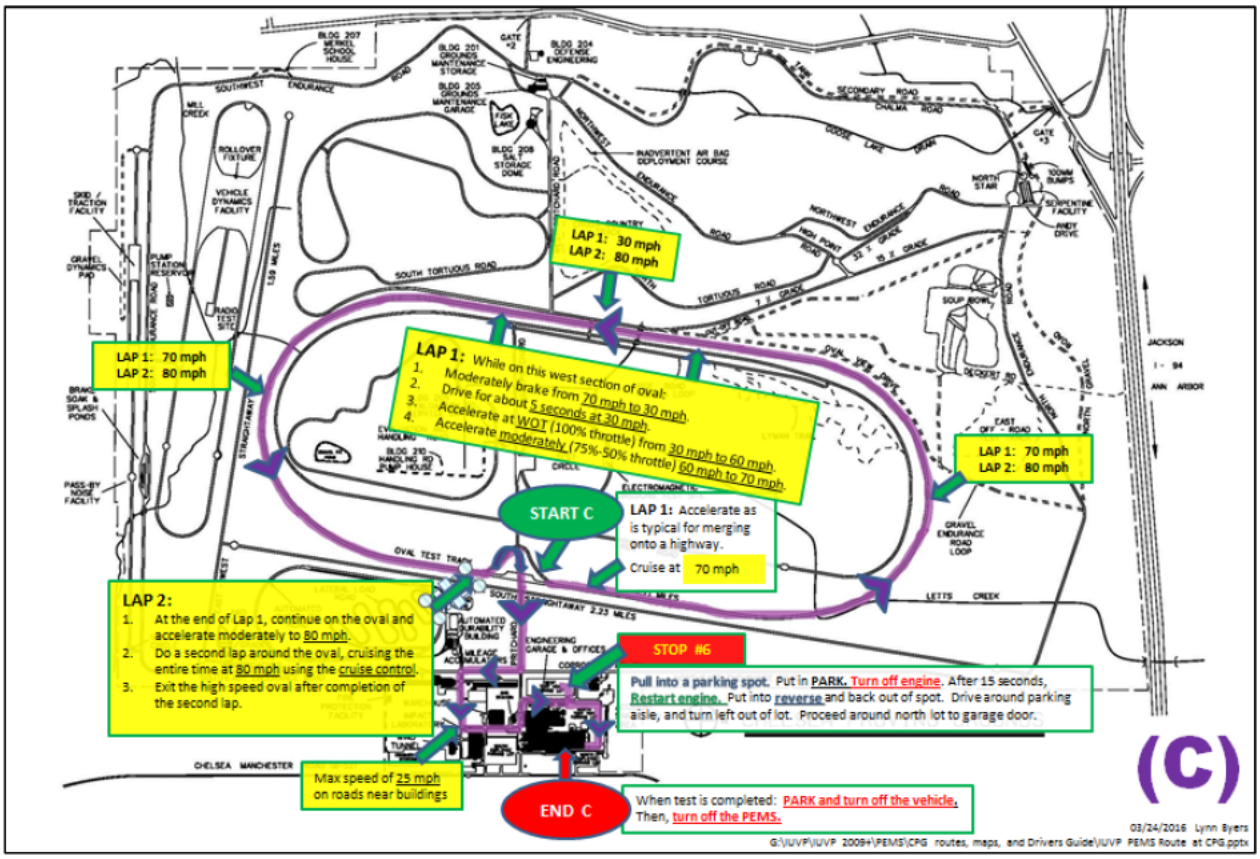
Transient Cycle: Outbound Portion



Transient Cycle: Inbound Portion



Transient Cycle: Oval & End Route



3. Test Methods

a. Vehicle Setup

FCA set the vehicles in the following operation mode for PEMS testing:

- Drive mode: standard drive mode
- A/C adjustment: as appropriate for weather conditions selected by the PEMS driver when driving with the windows closed
- Headlights / daylights: as appropriate for conditions present at the time of testing
- Fuel: certification fuel appropriate for the vehicle being tested
- Weight: curb weight of the vehicle as received plus weight of the driver and PEMS test equipment

b. Correlation

FCA performed weekly correlation testing on the chassis cells with each PEMS unit as a lab quality procedure.

c. PEMS Equipment Installation.

FCA installed PEMS equipment per manufacturer, Sensor, Inc., guidelines.

d. Testing Protocol.

FCA followed the following PEMS test protocol:

i. Pre-Test Preparation

- PEMS requires a minimum of one hour for analyzer warmup and stabilization
- Pre-test routine is performed after warmup (approximately .5 hours), including:
    - System verifications (temperatures and pressures)
    - Leak check
    - Time alignment
    - Exhaust Flow Meter tube purge and pressure zero
    - Zero calibration
    - Span calibration
    - Vehicle Interface communication (CAN data from OBD port)
    - Datafile and recording setup

ii. Conducting the PEMS Test

- **Steady-State PEMS test** is run at nine steady state speeds ranging from 30-85 MPH in the following sequence: 30, 50, 60, 65, 70, 65, 75, 80, 85 MPH. Emissions are collected during the stabilized steady-state plateaus (all transient data was also collected). In total, approximately 600 seconds of data are collected per step.
- **80 MPH Steady State Cruise PEMS test** is a 45-minute steady state cruise at 80 MPH. The total test time is approximately 2700 seconds long without key off or stopping. Emissions are collected during the stabilized steady state cruise (acceleration to 80 MPH at the beginning of the test and deceleration to a stop at the end of the test are also included).
- **Transient Cycle PEMS test** includes six stops, with one engine off stop, and with the remainder of the test as engine running with varying gear state. The speeds range from 0 MPH to 80

MPH and the route includes undulating and curved roads and 7% and 15% grade slopes. The oval track provides highway drive conditions. Refer to the Transient Cycle routes below for complete details.

iii. Post-Test Routine

- Post calibration (zero/span)
- Datafile processing and upload

iv. Emission Data Collection

- Steady-State test has 1 data file that is created during the test (consisting of all 9 vehicle speed steps), emissions data is taken at a 1 Hz sampling rate, and average constituent results are calculated for each vehicle speed step.
- Transient Cycle test has 1 data file that is created during the test, emissions data is taken at a 1 Hz sampling rate, and average constituent results are calculated for the Transient Cycle
- 80 MPH Steady State Cruise has 1 data file that is created during the test, emissions data is taken at a 1 Hz sampling rate, and average constituent results are calculated for the 80 MPH Steady State Cruise.
- As requested by the Agencies, FCA provides cumulative NOx (g) data as a calculated signal from the second-by-second PEMS data for Paragraph 59.a PEMS testing.
- As requested by the Agencies, relative to all of the second-by-second data for all (available) vehicle, engine, and PEMS parameters identified in Figure 3 of this PEMS Test Plan, data was collected for Paragraph 59.a. PEMS testing by FCA and provided to the Agencies for the entire Steady State PEMS test, Transient PEMS test, and the 80 MPH Steady State test, including the transient portions of the Steady State PEMS test and the 80 MPH Steady State test. As agreed by the Agencies, FCA then post-processed the Steady State PEMS test data and the 80 MPH Steady State test data in order to remove the transient portions from the averages calculated of the constituent pollutants.
- As requested by the Agencies, FCA recorded Engine Coolant Temperature and EGR related OBD PIDS (if equipped) for gasoline and diesel vehicles for Paragraph 59.a PEMS testing.

v. Test Validation and Data Analysis

- The datafile was reviewed for any errors or warnings that occurred during testing to determine if the test was valid, including the presence of all requested parameters.
- PEMS Test Engineer also reviewed the datafile for quality purposes after the test was complete.
- Summary tables were created using the following steps for each test.
    - **Steady-State PEMS test** – a Matlab code was created to filter the 9 speed phases of the test and then remove the first and last 30 seconds of each phase to ensure test stabilization and remove transient data; the g/mile values were then calculated with this post processed data.
    - **80 MPH Steady State Cruise PEMS test** – a Matlab code was created to filter the 80 MPH speed points of the test and then remove the first and last 30 seconds of each phase to ensure test stabilization and remove transient data; the g/mile values were then calculated with this post processed data.
    - **Transient Cycle PEMS test** – the post processed PEMS data file was used to calculate the g/mile values. Cumulative emissions for NOx, CO2, CO, NMHC and HC were calculated and then divided by the cumulative distance.

4. List of Available Emission, Vehicle, and Engine Parameters

As stated in Paragraph 59.c.ii, FCA measured emissions from the following five constituents: NOx, THC, NMHC, CO, and CO2. In addition to collecting emissions data for the required five constituents, as well as vehicle speed and percent engine load, FCA collected the following vehicle, engine, environmental and PEMS parameters shown in Figure 3 below from the PEMS test unit or as standard Parameter Identifier (PID) data based on what was available on any given vehicle.

Parameter Description	Parameter Name	Units
DATE	sDATE	mm/dd/yyyy
TIME	sTIME	hh:mm:ss.xxx
Gas Path	sSTATUS_PATH	
Dry-to-Wet Correction Factor	Kw	
NOx Humidity Correction Factor	iCALCRT_Kh	
Heated Line Avg. Duty	AvgDuty	%duty
FlameState	FlameState	
Block Temperature	BlockTemp	degC
Catalyst Temperature	CatalystTemp	degC
Weather Probe Humidity	iSCB_RH	%RH
Ambient Pressure	iSCB_LAP	mbar
Weather Probe Temperature	iSCB_LAT	degC
NOx Humidity Correction Factor	iCALCRT_Kh	
Exhaust Mass Flow Rate	icMASS_FLOW	kg/hr
Exhaust Volumetric Flow Rate - SCFM	EV_std	SCFM
Exhaust Volumetric Flow Rate - l/s (0 deg C referenced)	mEV_std0	l/s
Exhaust Temperature	iFLOW_EX_TEMP	degC
Upstream Pressure	iFLOW_UP_PRESS	kPa
Differential Pressure	iFLOW_SPLINED_PRESS	kPa
No. of DTCs	DTC_CNT	#
Load Percent	iENG_LOAD	%
Coolant Temp.	iCOOL_TEMP	degF
Engine RPM	iENG_SPEED	RPM
Vehicle Speed	iVEH_SPEED	mph
Mass Air Flow Rate	iMAF	g/s
Baro. Pressure	BARO	kPa
Control Voltage	VPWR	V
Amb. Air Temp.	AAT	degC
Accel. Postn D	APP_D	%
Accel. Postn E	APP_E	%
Fuel Inj. Timing	FUEL_TIMING	Deg
DD Eng. Pct. Torque	TQ_DD	%
Act. Eng. Pct. Torque	iPCNT_TORQUE	%
Eng. Ref. Torque	sREF_ENG_TORQUE	lb-ft
Cmd. EGR A Duty	EGR_A_CMD	%
Act. EGR A Duty	EGR_A_ACT	%
EGR A Duty Error	EGR_A_ERR	%
EGR Temp. 1-1	EGRTA	degC
Exhaust Press. 1	EP_1	kPa
Exh. Gas Temp. 1-1	EGT11	degC
Exh. Gas Temp. 1-2	EGT12	degC
Exh. Gas Temp. 1-3	EGT13	degC
DPF Delta Press. 1	DPF1_DP	kPa

Figure 3 – FCA Vehicle and Engine Parameters

Parameter Description	Parameter Name	Units
AECD1 Timer 1	AECD1_TIME1	S
AECD1 Timer 2	AECD1_TIME2	S
AECD2 Timer 1	AECD2_TIME1	S
AECD2 Timer 2	AECD2_TIME2	S
AECD3 Timer 1	AECD3_TIME1	S
AECD3 Timer 2	AECD3_TIME2	S
AECD4 Timer 1	AECD4_TIME1	S
AECD4 Timer 2	AECD4_TIME2	S
AECD5 Timer 1	AECD5_TIME1	S
AECD5 Timer 2	AECD5_TIME2	S
AECD6 Timer 1	AECD6_TIME1	S
AECD6 Timer 2	AECD6_TIME2	S
AECD7 Timer 1	AECD7_TIME1	S
AECD7 Timer 2	AECD7_TIME2	S
AECD8 Timer 1	AECD8_TIME1	S
AECD8 Timer 2	AECD8_TIME2	S
AECD9 Timer 1	AECD9_TIME1	S
AECD9 Timer 2	AECD9_TIME2	S
AECD10 Timer 1	AECD10_TIME1	S
AECD10 Timer 2	AECD10_TIME2	S
NOx 1-1	NOX11	ppm
NOx 1-2	NOX12	ppm
Reagent Tank Lvl.	REAG_LVL	%
AECD11 Timer 1	AECD11_TIME1	S
AECD11 Timer 2	AECD11_TIME2	S
AECD12 Timer 1	AECD12_TIME1	S
AECD12 Timer 2	AECD12_TIME2	S
AECD13 Timer 1	AECD13_TIME1	S
AECD13 Timer 2	AECD13_TIME2	S
AECD14 Timer 1	AECD14_TIME1	S
AECD14 Timer 2	AECD14_TIME2	S
AECD15 Timer 1	AECD15_TIME1	S
AECD15 Timer 2	AECD15_TIME2	S
DPF Regen Status	DPF_REG_ST	
Norm. DPF Trig. Pct	DPF_REG_PCT	%
Avg. Time Btwn Rgns	DPF_REG_AVGT	min
Avg. Dist. Btwn Rgns	DPF_REG_AVGD	km
Eng. Frictn Pct. Tq	iFRICT_TORQUE	%
PM Sensor 1-1	PM11	%
Engine Fuel Rate	ENG_FUEL_RATE	g/s
Eng. Exh. Flow Rate	EXH_RATE	kg/hr
Corr. NOx 1-1	NOXC11	ppm
Corr. NOx 1-2	NOXC12	ppm
Cylinder Fuel Rate	CYL_RATE	mg/str

Figure 3 – FCA Vehicle and Engine Parameters (cont.)

Parameter Description	Parameter Name	Units
Vehicle Speed	imVEH_SPEED	km/h
Engine Coolant Temperature	imCOOL_TEMP	deg C
GPS Latitude	iGPS_LAT	Deg
GPS Longitude	iGPS_LON	Deg
GPS Altitude	iGPS_ALT	m
GPS Speed	iGPS_GROUND_SPEED	mph
GPS Ground Speed	imGPS_GROUND_SPEED	km/h
Fuel Rate	iWfgps	gal/s
Instantaneous Fuel Flow	iWf	g/s
Air/Fuel Ratio at stoichiometry	AF_Stoich	
Air/Fuel Ratio of Sample	AF_Calc	
Lambda	Lambda	
Humidity of Exhaust	H2O_exh	%
Sample Temperature	iFEM_SAMPLE_RH_TEMP	degC
Sample Humidity	iFEM_SAMPLE_RH	%RH
Sample Flow	SampFlow	lpm
Water Trap Pressure	WaterTrapPress	kPa
Sample Vacuum	SampleVacuum	kPa
Dryer Inlet Temperature	DryerInTemp	degC
Drain Temperature	DrainTemp	degC
Heated Filter Temperature	HtdFltrTemp	degC
Ambient Temperature	AmbientTemp	degC
Calibration Gas Pressure	CalGasPress	kPa
Heated Line Avg. Duty	AvgDuty	%duty
AMB Ambient Temperature	AmbTemp	degC
AMB Pressure	float.AMB_Pressure	mbar
AMB Lamp Temperature	LampTemp	degC
Detector Temperature	DetectorTemp	degC
NDUV Temperature	iNDUV_BT1	degC
NDUV Pressure	iNDUV_PRESSURE	kPa
Gas Analyzer Enclosure Temperature	NOXCaseTemp	degC
Status	Status	
Faults	Faults	
Gas Analyzer Current	GASCurrent	A
Exhaust Flow Meter Current	EFMCurrent	A
Sample Conditioning System Current	SCSCurrent	A
Heated Line Current	HTLCurrent	A
Auxiliary 1 Current	Aux1Current	A
Auxiliary 2 Current	Aux2Current	A
Auxiliary 3 Current	Aux3Current	A
Microcontroller Current	McuCurrent	A
Ethernet Switch Current	EthernetCurrent	A
Cab Module Current	CabModuleCurrent	A
Wireless AP Current	WiFiCurrent	A
Battery 1 Current	Batt1Current	A
Battery 2 Current	Batt2Current	A
Total Current	TotalCurrent	A
Battery 1 Voltage	Batt1Voltage	V
Battery 2 Voltage	Batt2Voltage	V
DC Rail Voltage	DCRailVoltage	V
Max. Input Voltage	MaxInputVoltage	V
Min. Input Voltage	MinInputVoltage	V
Amp Hours Consumed From Input 1	AmpHoursConsumedInput1	AH
Amp Hours Consumed From Input 2	AmpHoursConsumedInput2	AH
Catalyst Temperature	CatalystTemp	degC

Figure 3 – FCA Vehicle and Engine Parameters (cont.)

IV. Results

The following tables and figures summarize the PEMS emissions data. Each vehicle was driven on each test route at least once. In certain circumstances, a vehicle route may have been repeated. Accordingly, the results below reflect data from those initial tests and the repeats. However, when a test was deemed invalid due to missing PID channels requested by the Agencies, data from that invalid test were not included in the results below.

1. Vehicle 1 - KCRXT01.35P0 - V9BVJ6983
Jeep Renegade 1.3L Turbo 9-speed Automatic AWD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0001	230.0743	0.0597	0.0000	0.0000
50	0.0000	245.1522	0.3156	0.0000	0.0000
60	0.0000	293.7035	0.2011	-0.0004	0.0008
65	0.0000	314.6120	0.1554	0.0000	0.0029
70	0.0000	350.3256	0.3350	0.0001	0.0064
65	0.0000	320.3479	0.2077	-0.0016	0.0030
75	0.0000	381.6676	0.4797	-0.0010	0.0088
80	0.0001	428.7341	0.8165	-0.0010	0.0105
85	0.0002	459.7647	1.0668	-0.0010	0.0132

Table 1.1: Vehicle 1 – Steady State
File: V9BVJ6983_SSPEMS010419111080

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0000	424.3605	0.6903	0.0076	0.0113

Table 1.2: Vehicle 1 – 80 MPH Steady State Cruise
File: V9BVJ6983_80SS45010419111080

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0054	386.6239	2.8555	0.0181	0.0256

Table 1.3: Vehicle 1 – Transient Cycle
File: V9BVJ6983_P-IUVP010419111080

b. Summary Plots

i. Steady State PEMS Test

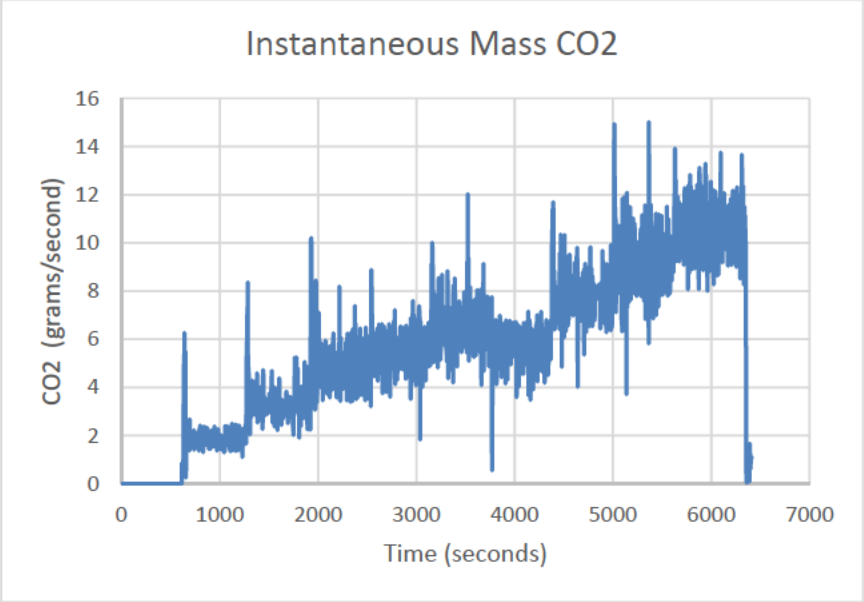


Figure 1.1.1: Vehicle 1 – Steady State Instantaneous Mass CO_2

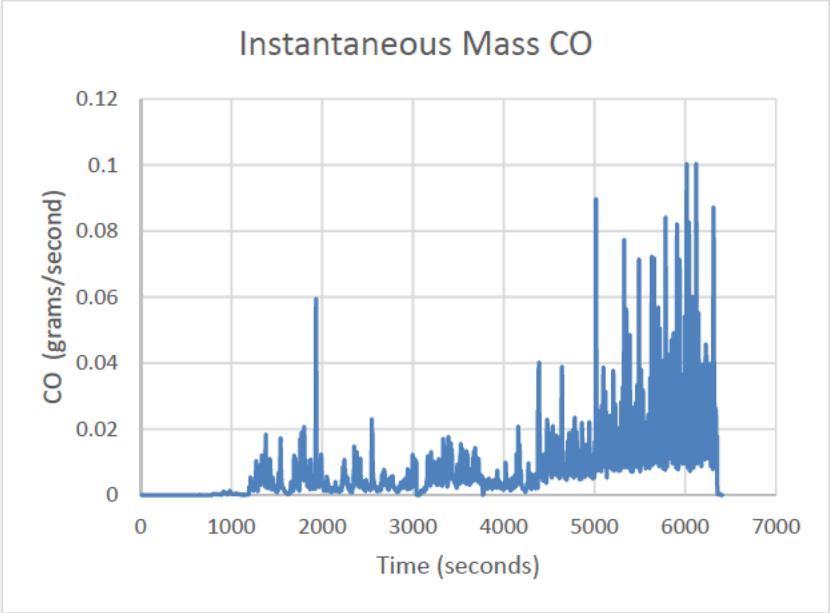


Figure 1.1.2: Vehicle 1 – Steady State Instantaneous Mass CO

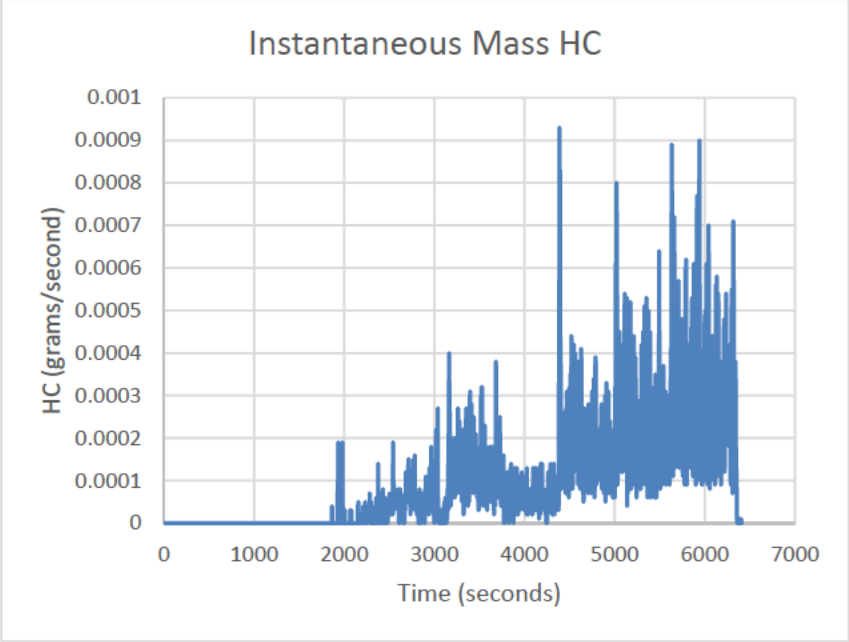


Figure 1.1.3: Vehicle 1 – Steady State Instantaneous Mass HC

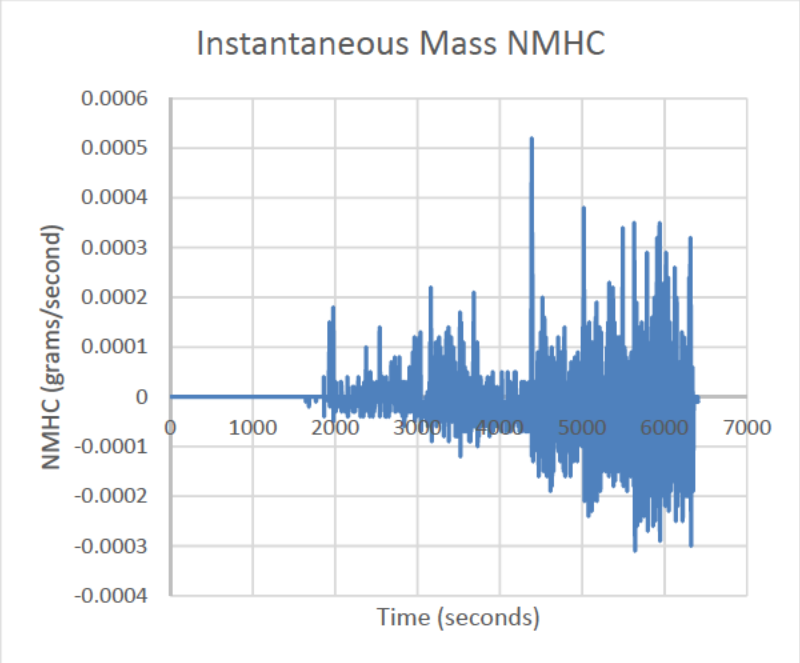


Figure 1.1.4: Vehicle 1 – Steady State Instantaneous Mass NMHC

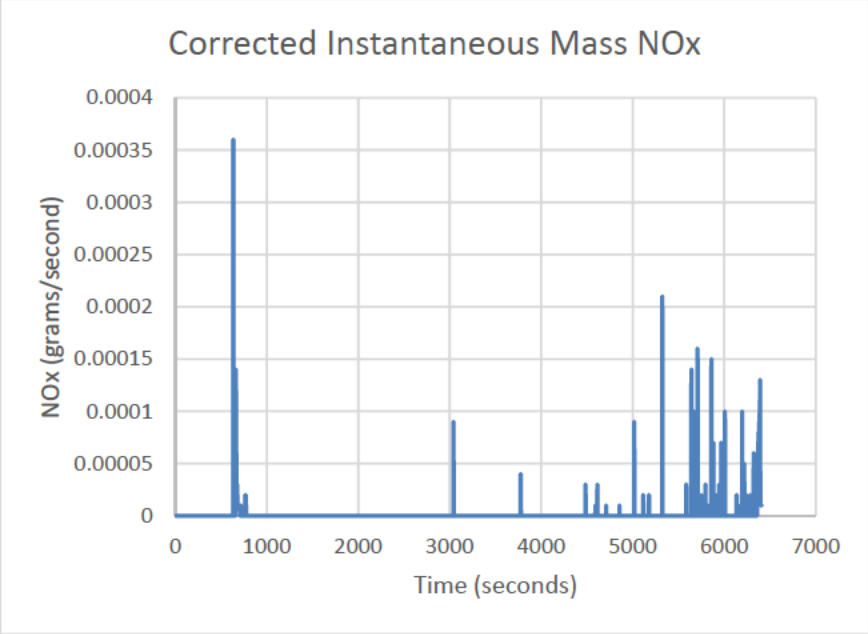


Figure 1.1.5: Vehicle 1 – Steady State Corrected Instantaneous Mass NOx

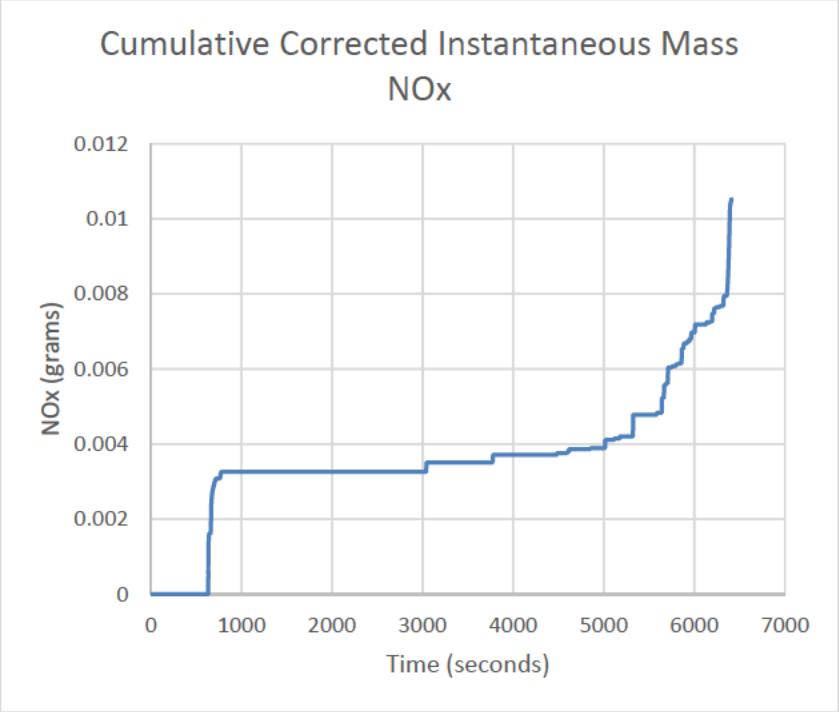


Figure 1.1.6: Vehicle 1 – Steady State Cumulative Corrected Instantaneous Mass NOx

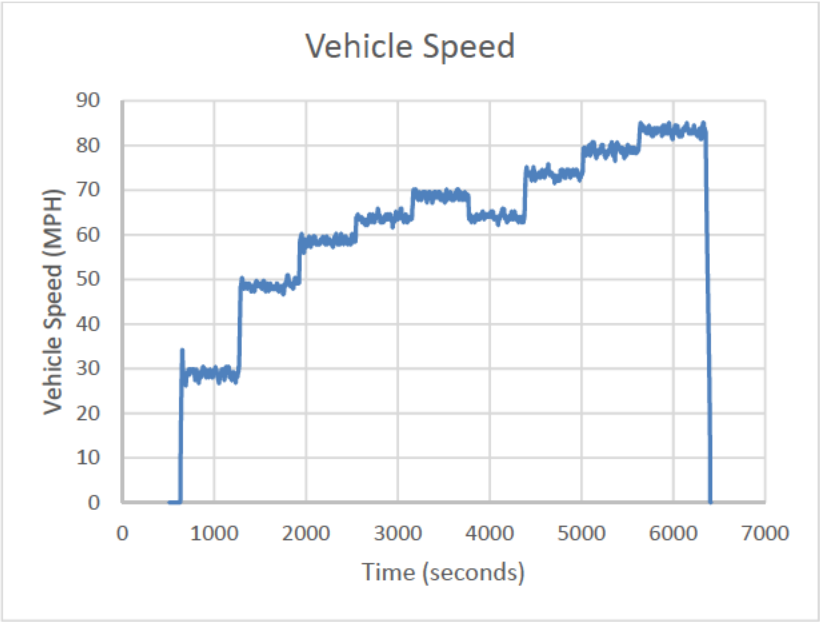


Figure 1.1.7: Vehicle 1 – Steady State Vehicle Speed

ii. 80 MPH Steady State Cruise PEMS Test

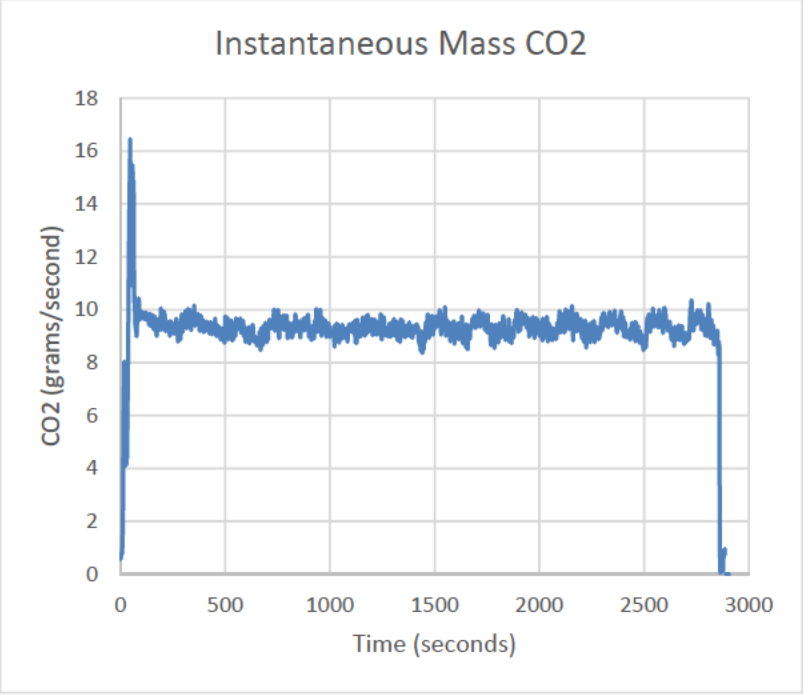


Figure 1.2.1: Vehicle 1 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

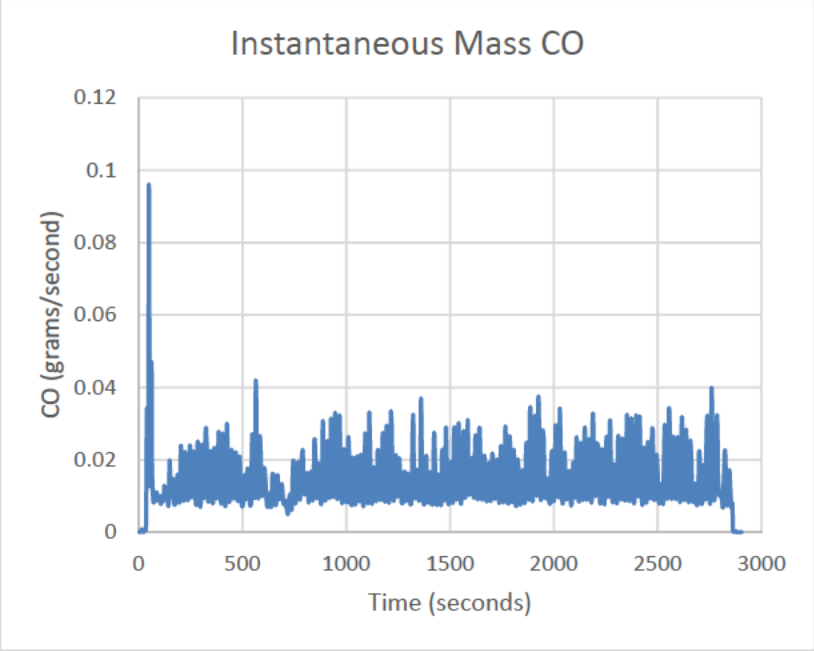


Figure 1.2.2: Vehicle 1 – 80 MPH Steady State Cruise Instantaneous Mass CO

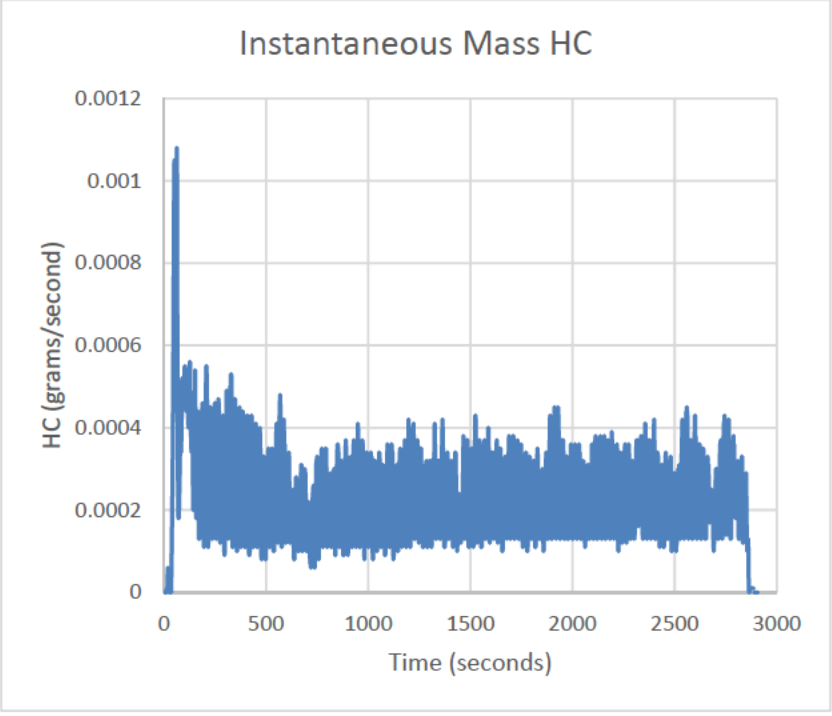


Figure 1.2.3: Vehicle 1 – 80 MPH Steady State Cruise Instantaneous Mass HC

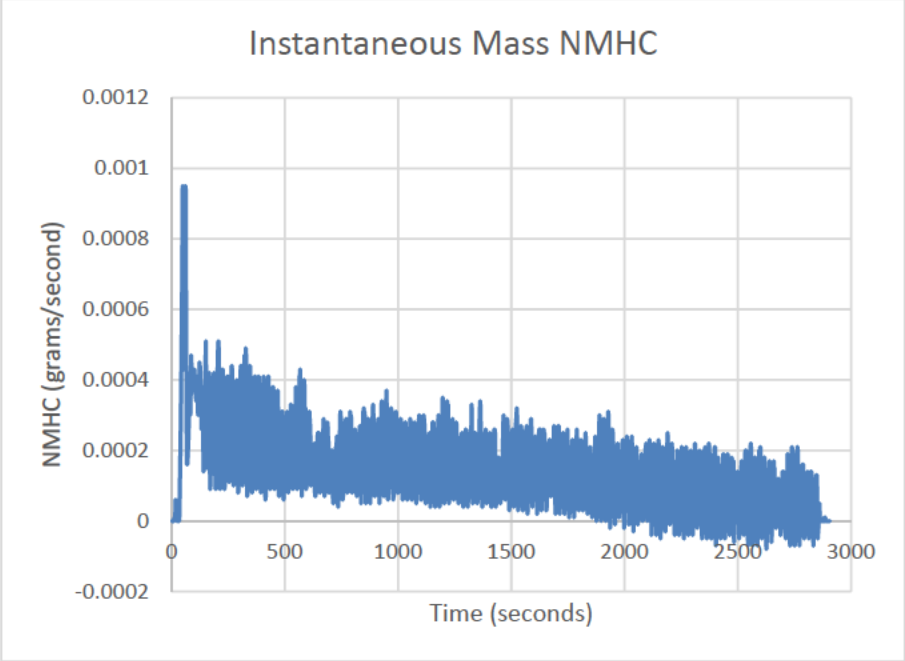


Figure 1.2.4: Vehicle 1 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

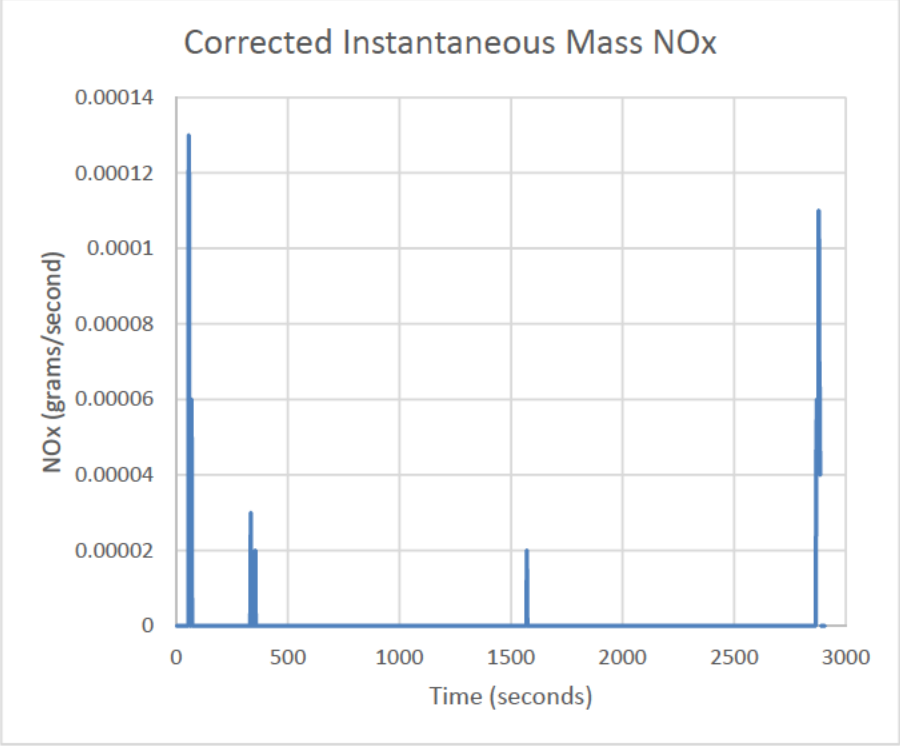


Figure 1.2.5: Vehicle 1 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

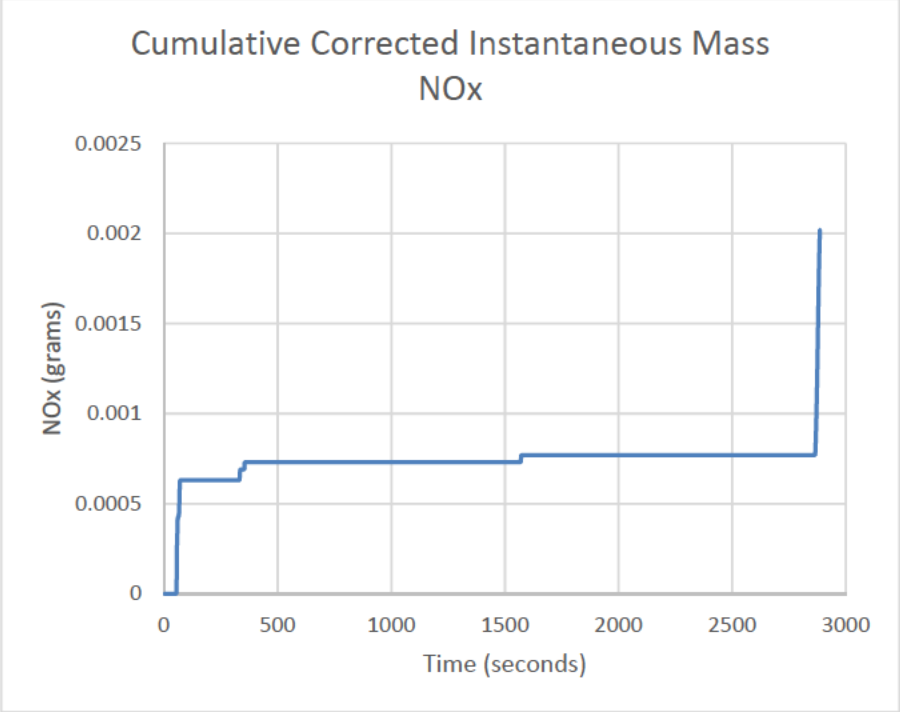


Figure 1.2.6: Vehicle 1 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

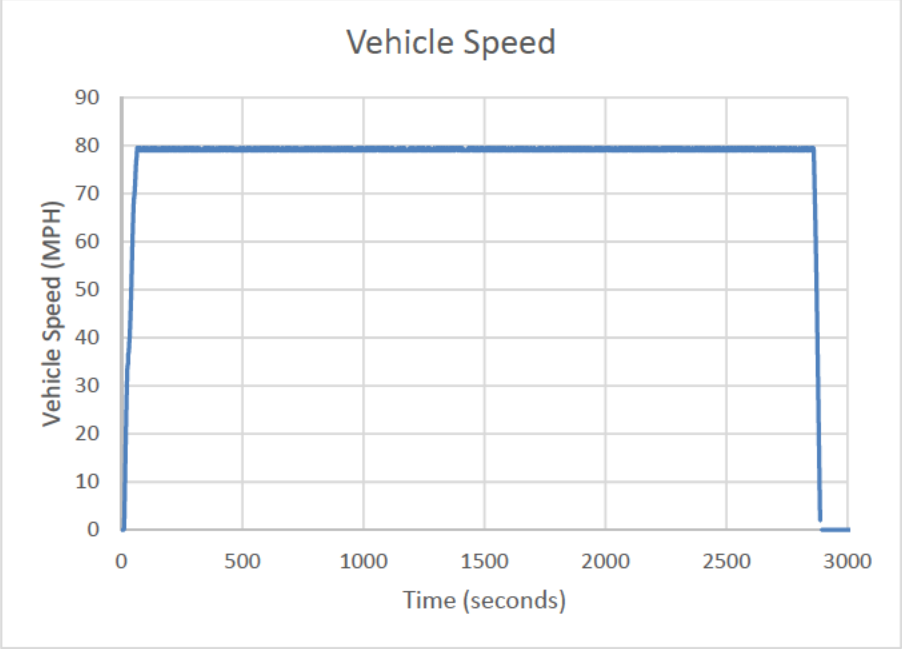


Figure 1.2.7: Vehicle 1 – 80 MPH Steady State Cruise Vehicle Speed

iii. Transient Cycle PEMS Test

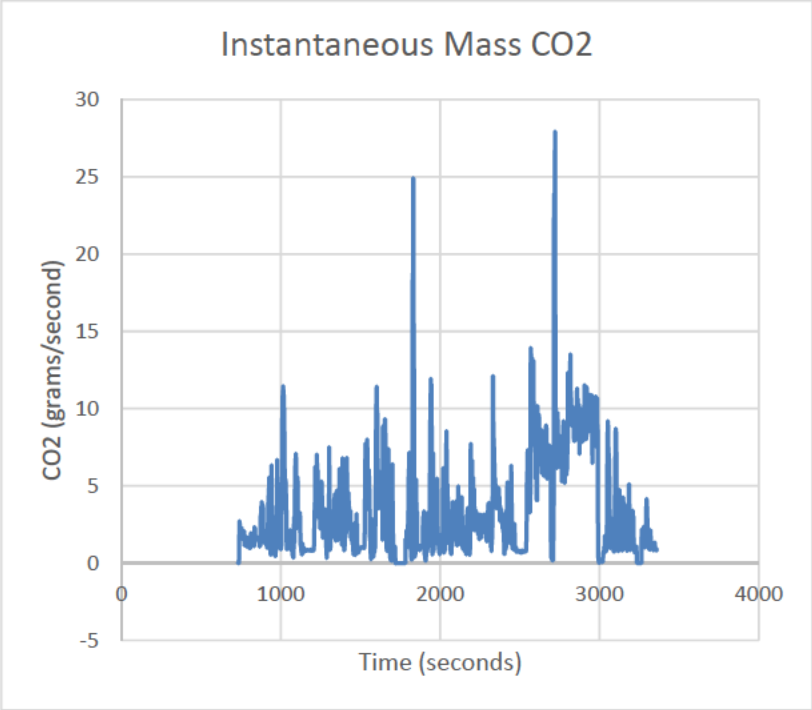


Figure 1.3.1: Vehicle 1 – Transient Cycle Instantaneous Mass CO_2

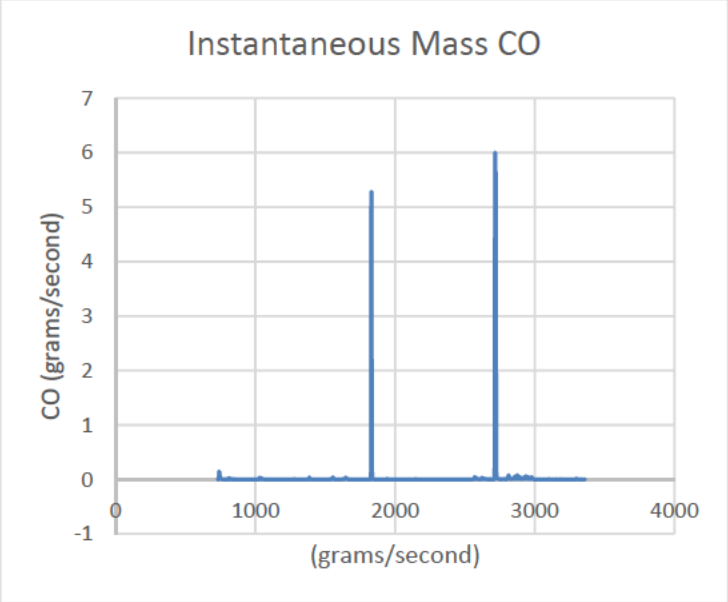


Figure 1.3.2: Vehicle 1 – Transient Cycle Instantaneous Mass CO

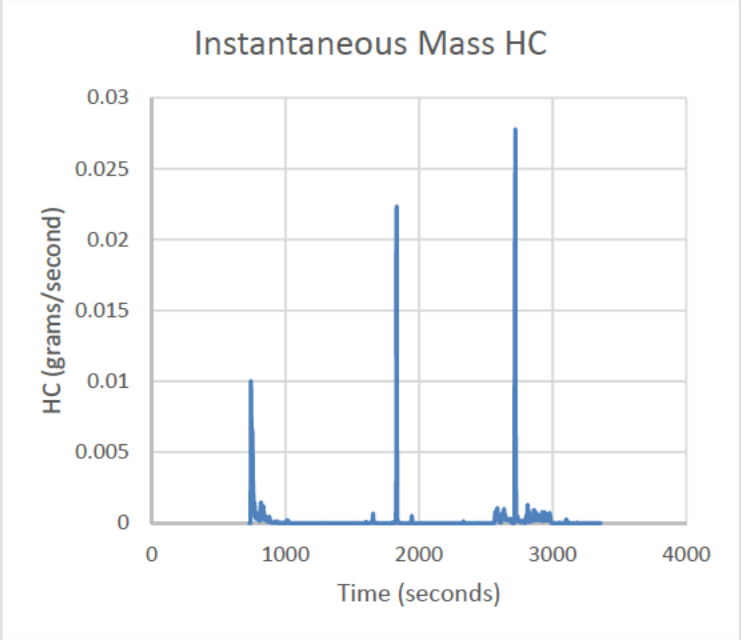


Figure 1.3.3: Vehicle 1 – Transient Cycle Instantaneous Mass HC

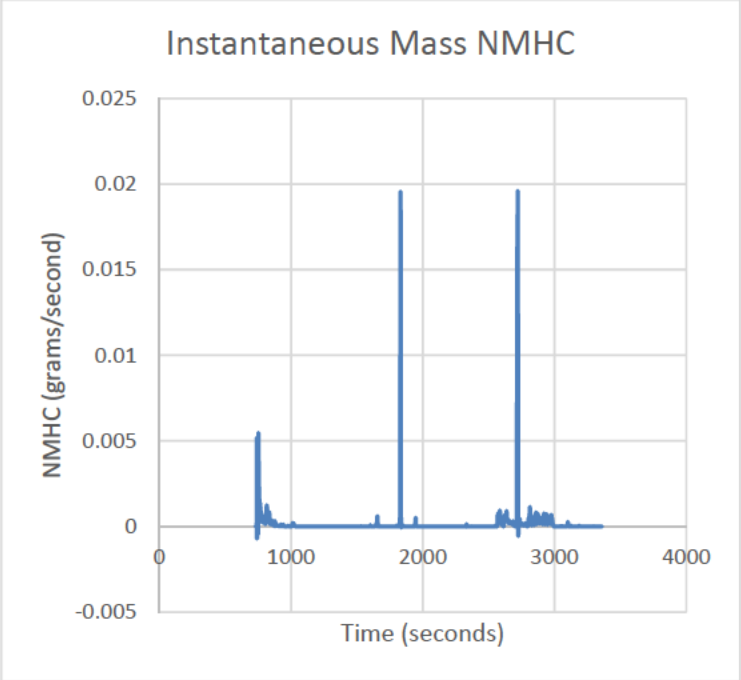


Figure 1.3.4: Vehicle 1 – Transient Cycle Instantaneous Mass NMHC

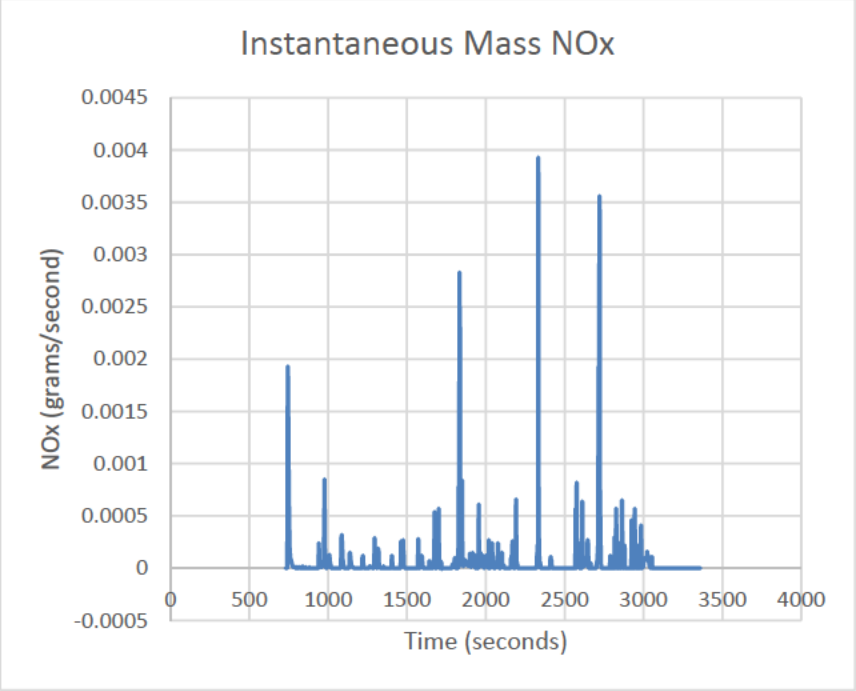


Figure 1.3.5: Vehicle 1 – Transient Cycle Instantaneous Mass NOx

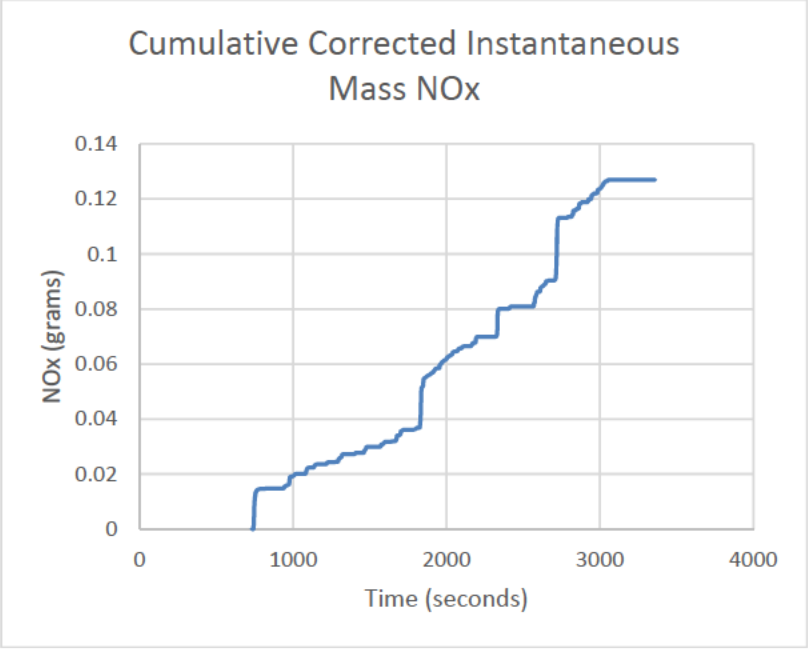


Figure 1.3.6: Vehicle 1 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

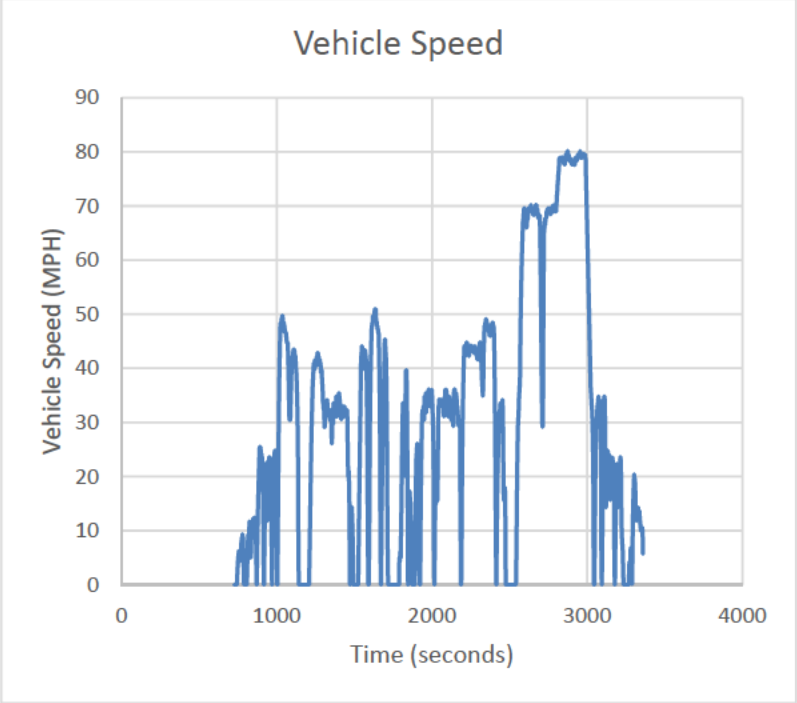


Figure 1.3.7: Vehicle 1 – Transient Cycle Vehicle Speed

2. Vehicle 2 - KCRXT02.05P0 - V9KLJ0733
Jeep Cherokee 2.0L Turbo ESS AUTOMATIC 9-speed AWD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0020	188.5314	0.0541	-0.0001	0.0001
50	0.0028	278.5791	0.0957	-0.0010	0.0003
60	0.0039	331.6313	0.1865	-0.0013	0.0007
65	0.0048	368.8021	0.2192	-0.0011	0.0029
70	0.0057	370.4763	0.4554	0.0107	0.0210
65	0.0055	363.3351	0.3881	0.0127	0.0247
75	0.0058	365.7862	0.5627	0.0043	0.0170
80	0.0068	404.5290	0.3939	-0.0001	0.0083
85	0.0077	452.0778	0.5784	-0.0005	0.0081

Table 2.1: Vehicle 2 – Steady State
File: V9KLJ0733_SSPEMS010119112380

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0052	405.5550	0.3178	0.0029	0.0051

Table 2.2: Vehicle 2 – 80 MPH Steady State Cruise
File: V9KLJ0733_80SS45010119112380

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0132	455.7138	4.1090	0.0170	0.0316

Table 2.3: Vehicle 2 – Transient Cycle
File: V9KLJ0733_P-IUVP010119121680

b. Summary Plots

i. Steady State PEMS Test

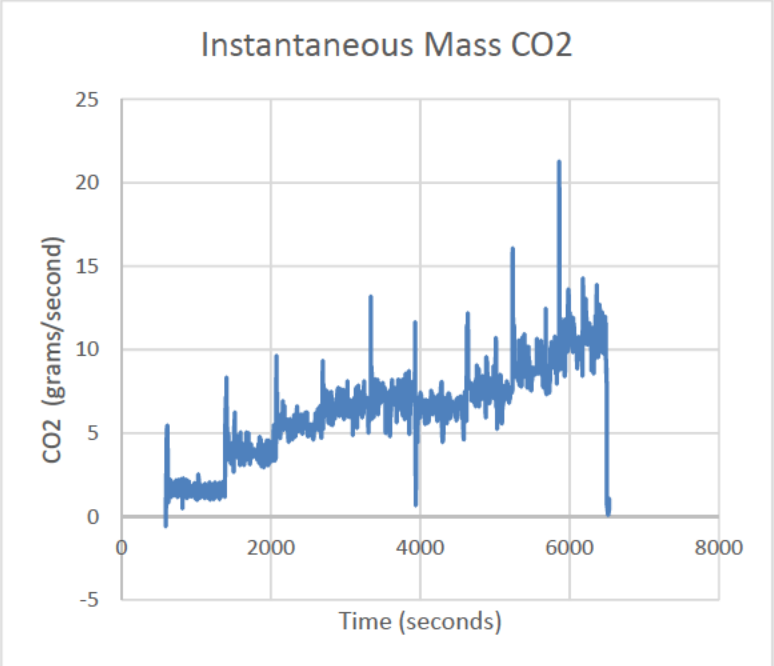


Figure 2.1.1: Vehicle 2 – Steady State Instantaneous Mass CO_2

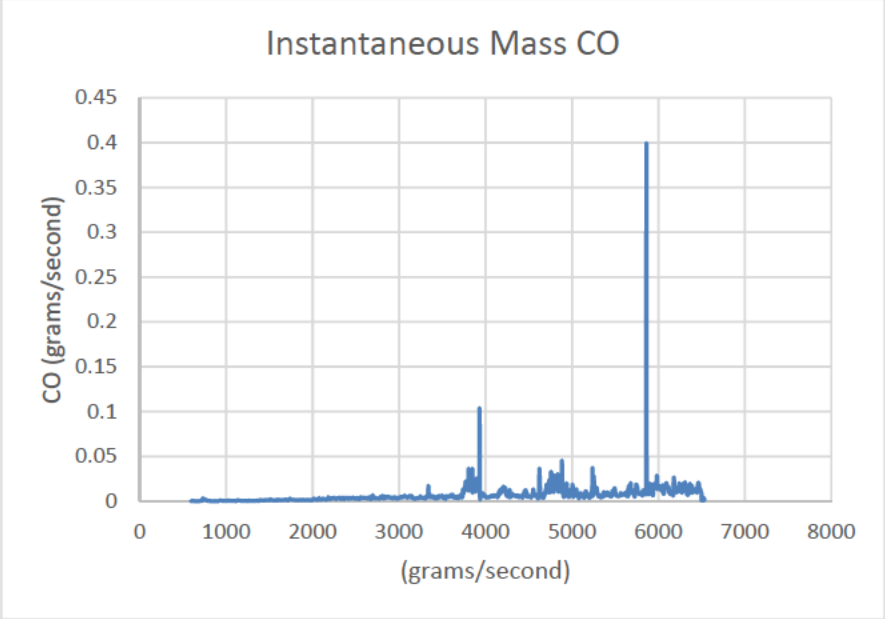


Figure 2.1.2: Vehicle 2 – Steady State Instantaneous Mass CO

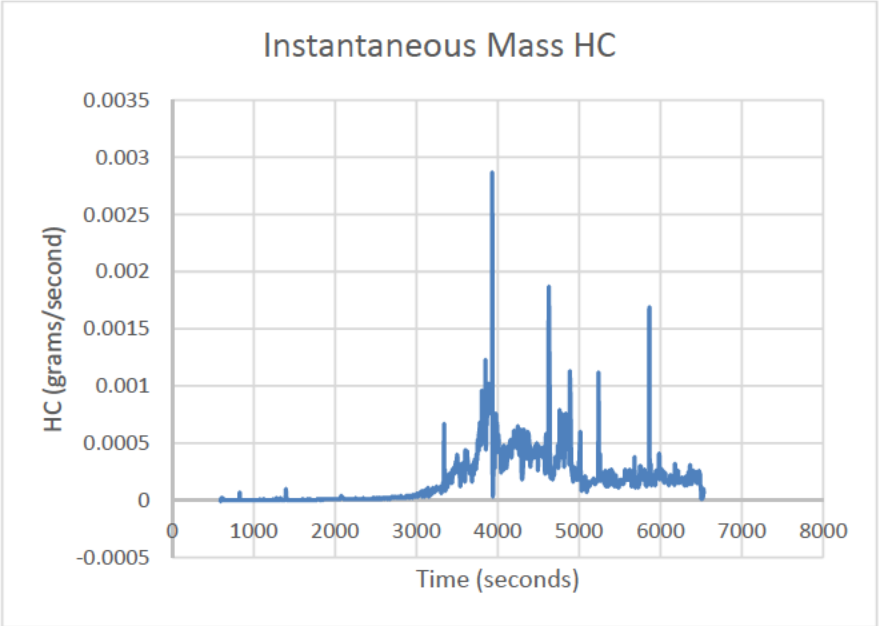


Figure 2.1.3: Vehicle 2 – Steady State Instantaneous Mass HC

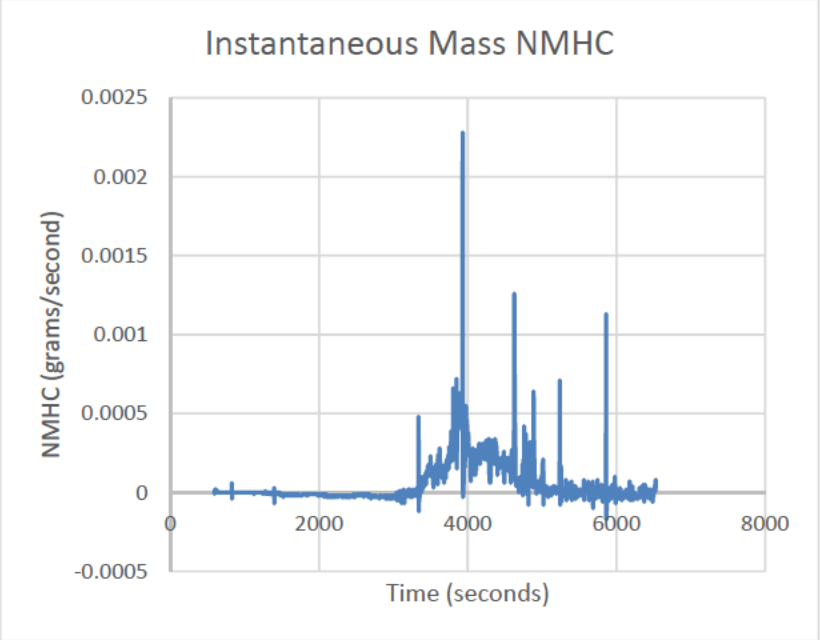


Figure 2.1.4: Vehicle 2 – Steady State Instantaneous Mass NMHC

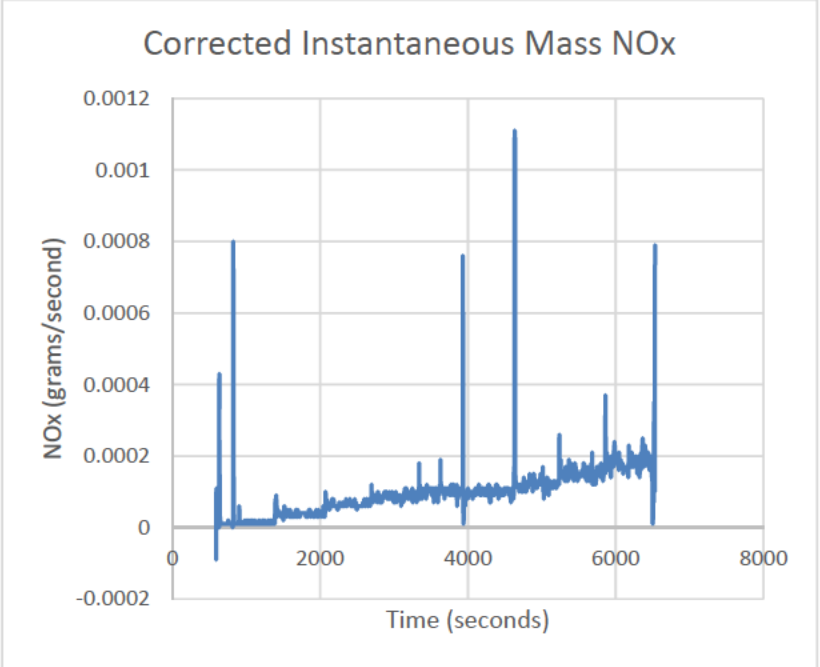


Figure 2.1.5: Vehicle 2 – Steady State Corrected Instantaneous Mass NOx

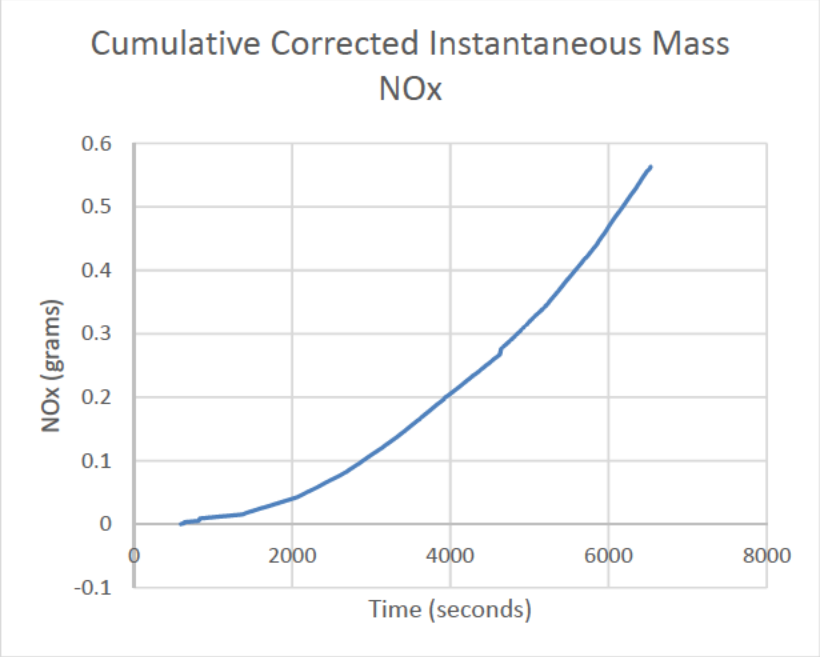


Figure 2.1.6: Vehicle 2 – Steady State Cumulative Corrected Instantaneous Mass NOx

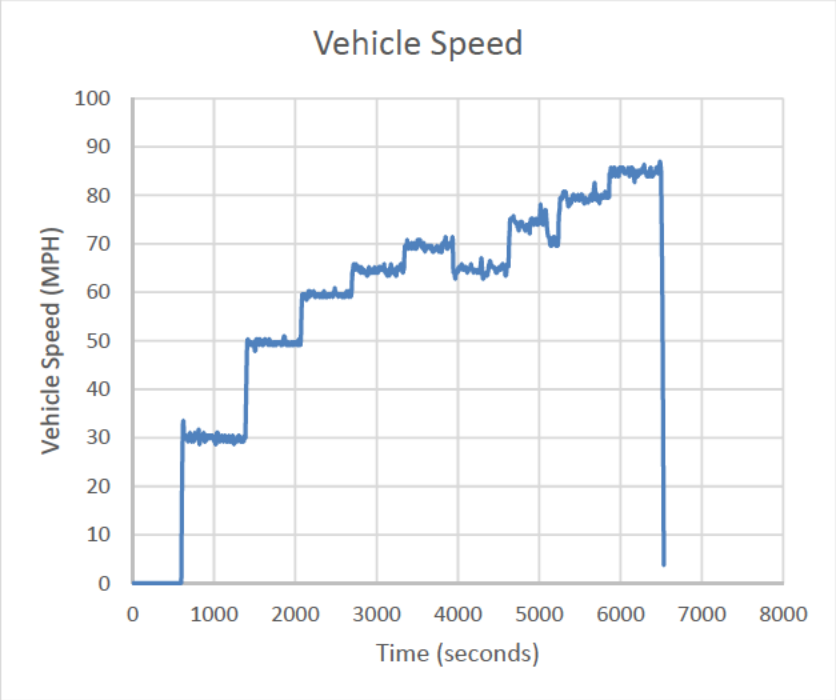


Figure 2.1.7: Vehicle 2 – Steady State Vehicle Speed

ii. 80 MPH Steady State Cruise PEMS Test

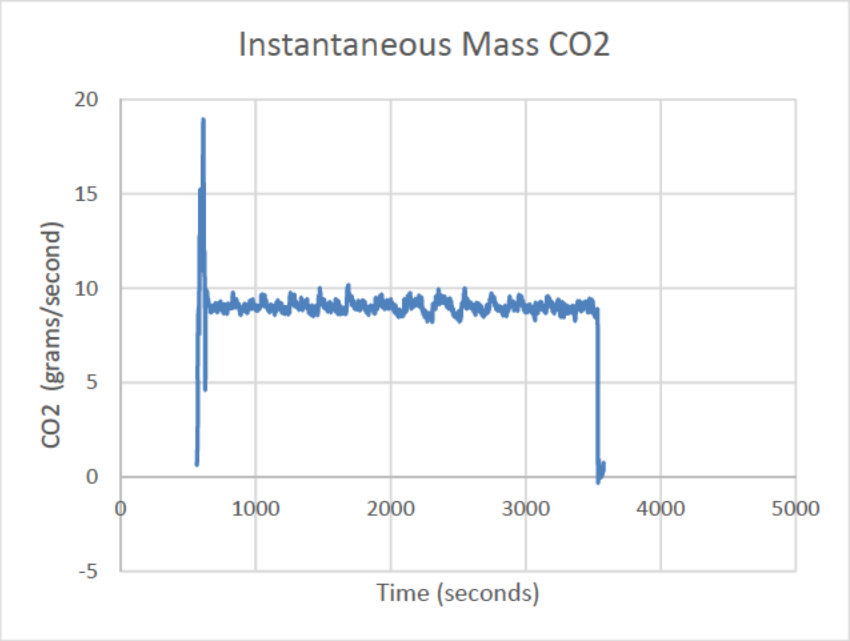


Figure 2.2.1: Vehicle 2 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

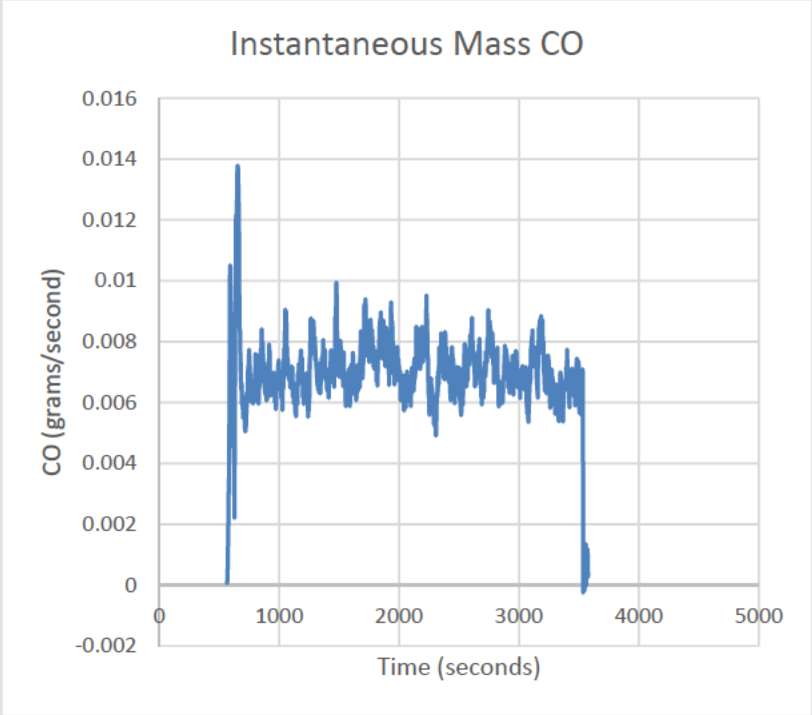


Figure 2.2.2: Vehicle 2 – 80 MPH Steady State Cruise Instantaneous Mass CO

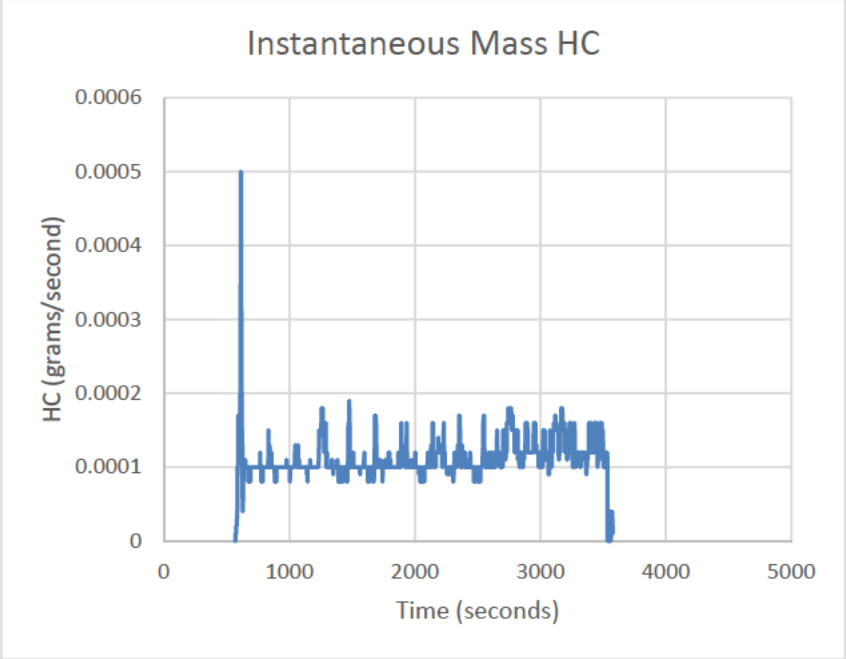


Figure 2.2.3: Vehicle 2 – 80 MPH Steady State Cruise Instantaneous Mass HC

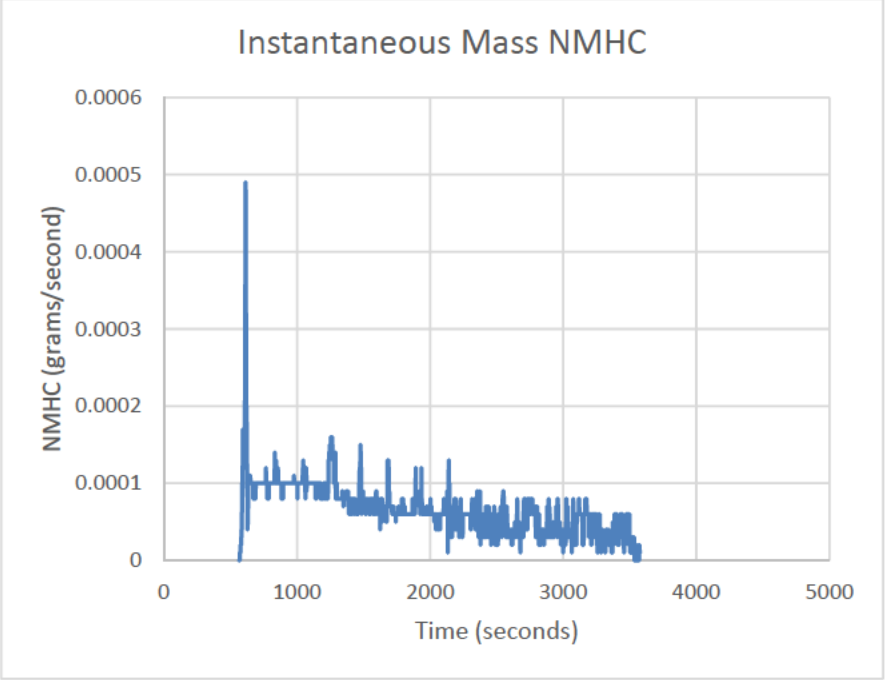


Figure 2.2.4: Vehicle 2 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

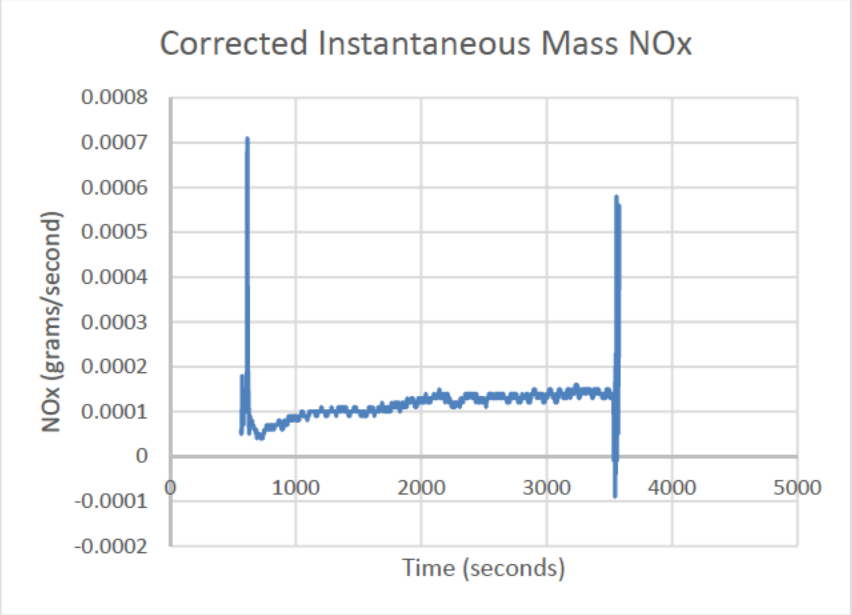


Figure 2.2.5: Vehicle 2 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

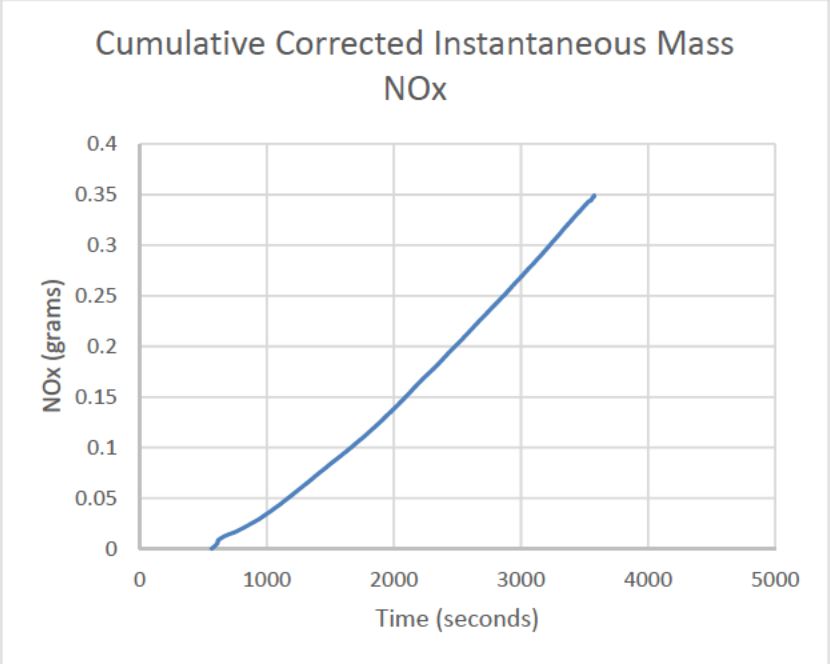


Figure 2.2.6: Vehicle 2 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

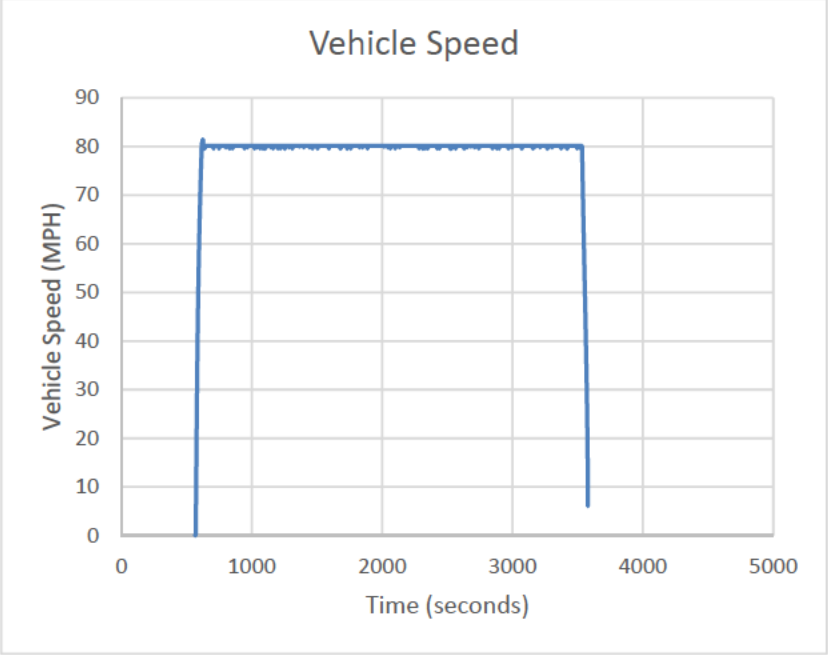


Figure 2.2.7: Vehicle 2 – 80 MPH Steady State Cruise Vehicle Speed

iii. Transient Cycle PEMS Test

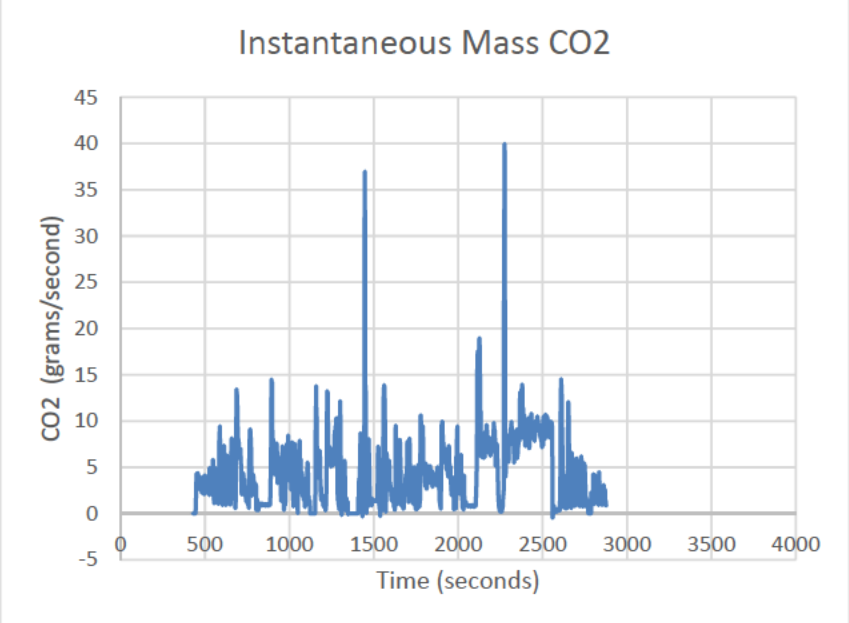


Figure 2.3.1: Vehicle 2 – Transient Cycle Instantaneous Mass CO_2

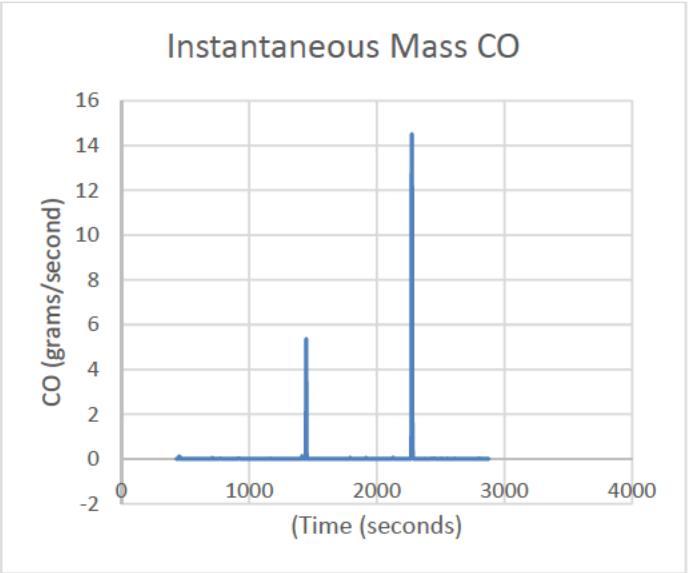


Figure 2.3.2: Vehicle 2 – Transient Cycle Instantaneous Mass CO

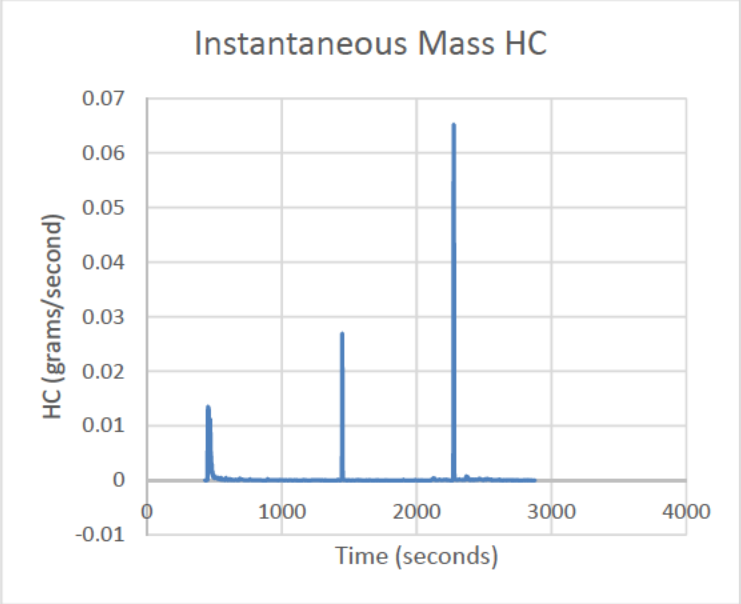


Figure 2.3.3: Vehicle 2 – Transient Cycle Instantaneous Mass HC

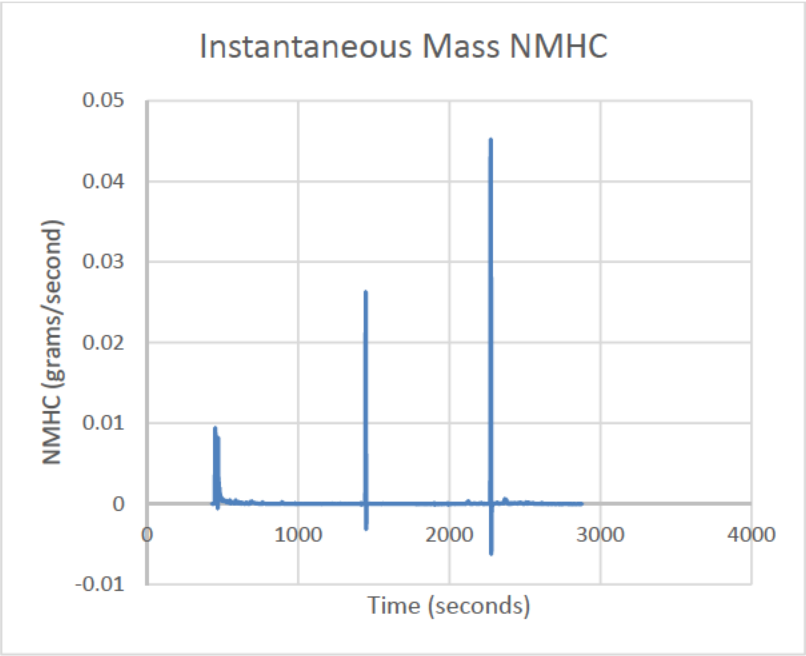


Figure 2.3.4: Vehicle 2 – Transient Cycle Instantaneous Mass NMHC

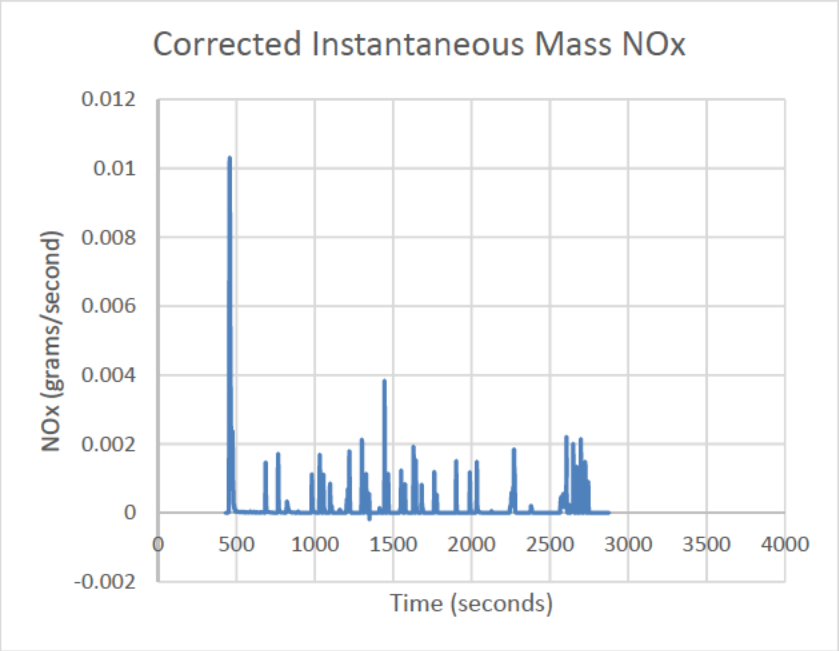


Figure 2.3.5: Vehicle 2 – Transient Cycle Instantaneous Mass NOx

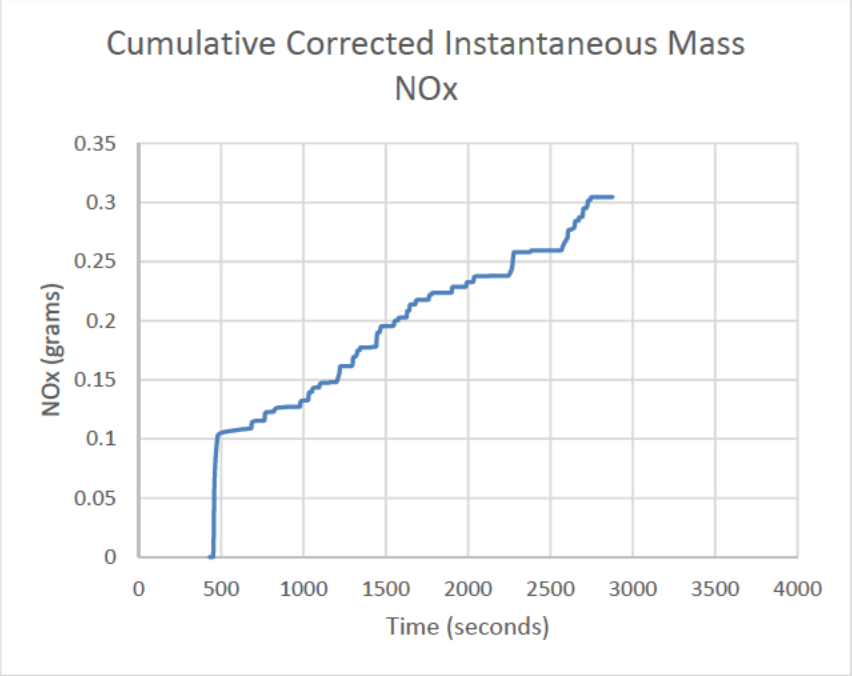


Figure 2.3.6: Vehicle 2 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

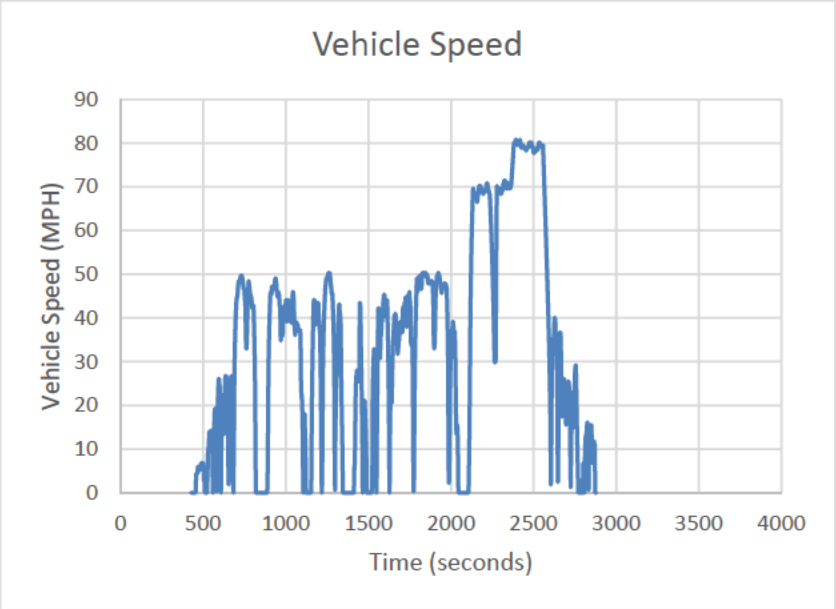


Figure 2.3.7: Vehicle 2 – Transient Cycle Vehicle Speed

3. Vehicle 3 - KCRXT02.05P1 - V9JLJ7551
Jeep Wrangler 2.0L Turbocharged BSG Automatic 8-speed 4WD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0003	211.4012	0.0668	0.0000	0.0000
50	0.0000	279.1834	0.0781	-0.0004	0.0000
60	0.0000	344.2325	0.2463	-0.0002	0.0020
65	0.0000	382.7575	0.4372	0.0024	0.0081
70	0.0000	436.7961	0.6034	-0.0002	0.0052
65	0.0000	377.0962	0.4517	-0.0009	0.0031
75	0.0000	480.2487	0.7380	-0.0014	0.0041
80	0.0000	535.3464	0.9867	-0.0013	0.0047
85	0.0000	581.7334	1.3941	-0.0008	0.0061

Table 3.1: Vehicle 3 – Steady State
File: V9JLJ7551_SSPEMS010519112180

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0000	550.7123	1.0654	-0.0001	0.0052

Table 3.2: Vehicle 3 – 80 MPH Steady State Cruise
File**:** V9JLJ7551_80SS45010119112180

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0140	470.5854	4.5253	0.0164	0.0302

Table 3.3: Vehicle 3 – Transient Cycle
File**:** V9JLJ7551_P-IUVP010119112180

b. Summary Plots

i. Steady State PEMS Test

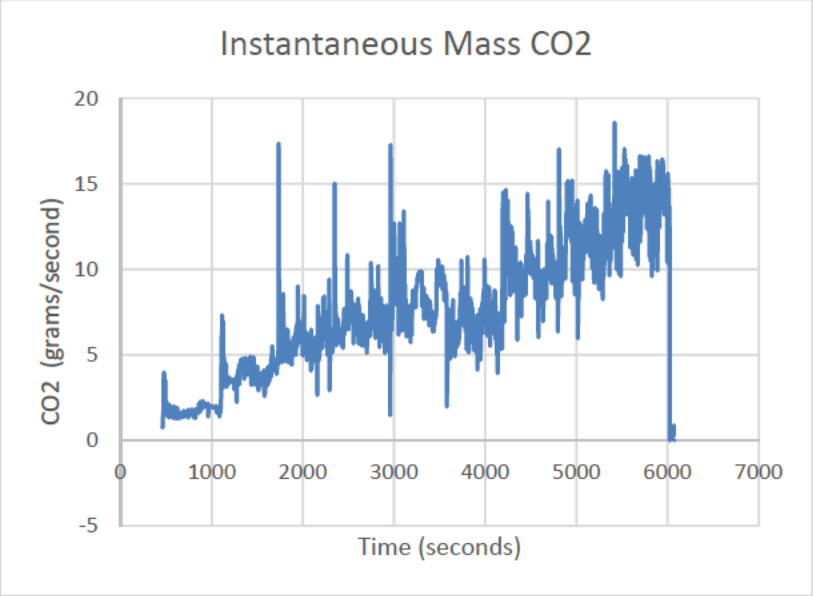


Figure 3.1.1: Vehicle 3 – Steady State Instantaneous Mass CO_2

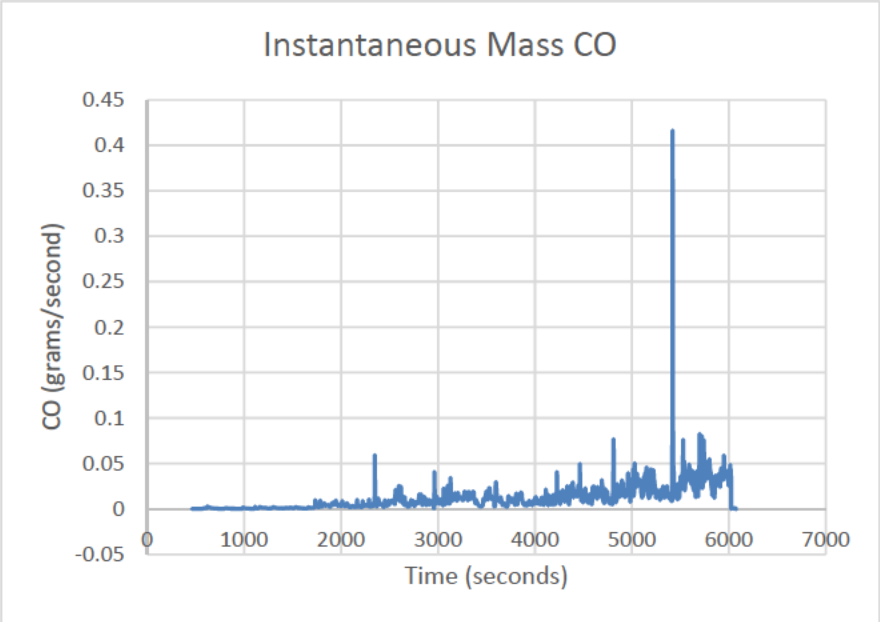


Figure 3.1.2: Vehicle 3 – Steady State Instantaneous Mass CO

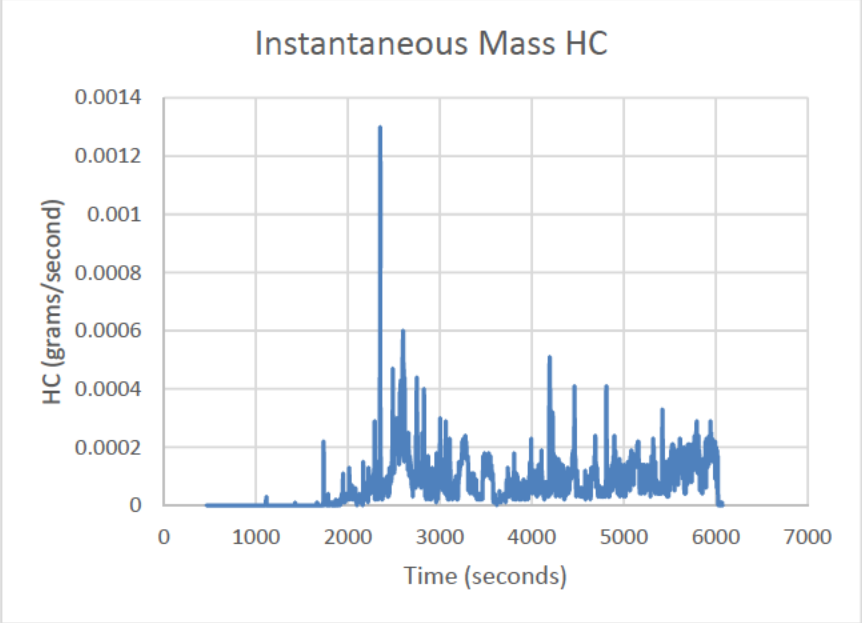


Figure 3.1.3: Vehicle 3 – Steady State Instantaneous Mass HC

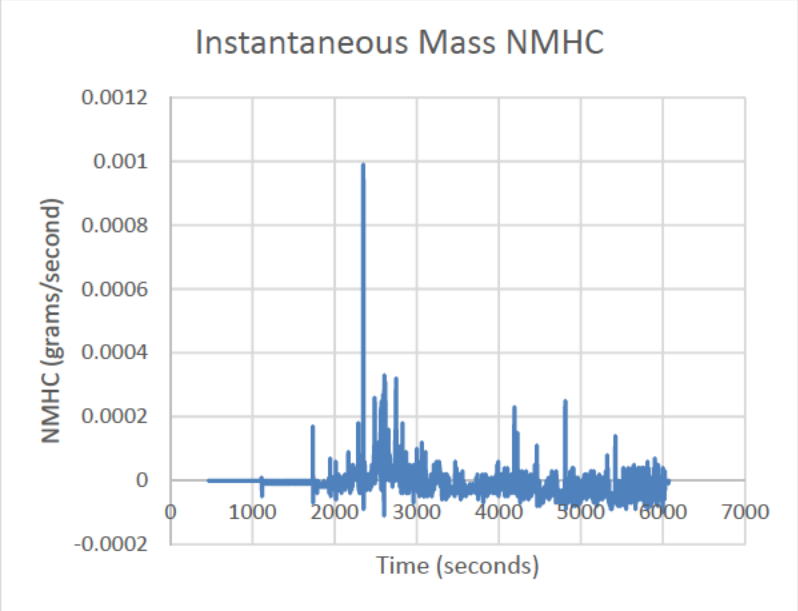


Figure 3.1.4: Vehicle 3 – Steady State Instantaneous Mass NMHC

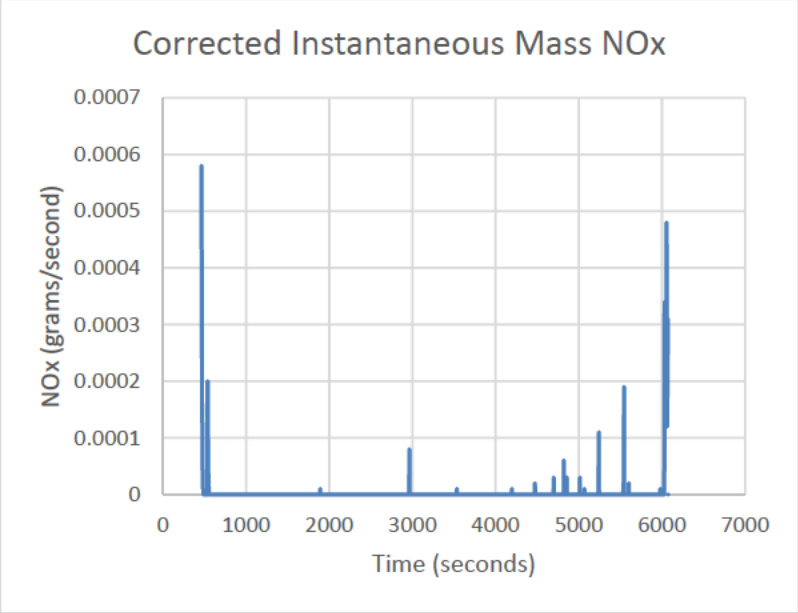


Figure 3.1.5: Vehicle 3 – Steady State Corrected Instantaneous Mass NOx

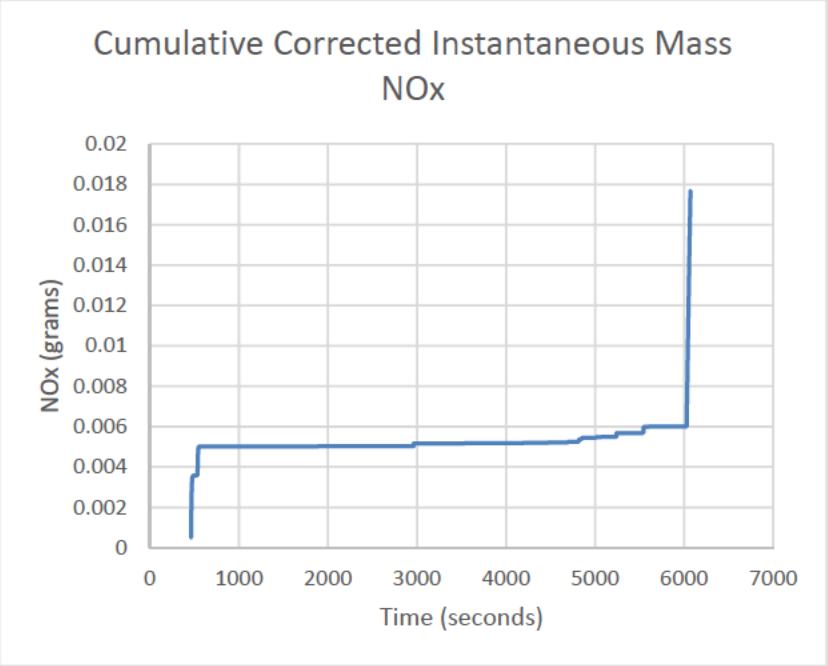


Figure 3.1.6: Vehicle 3 – Steady State Cumulative Corrected Instantaneous Mass NOx

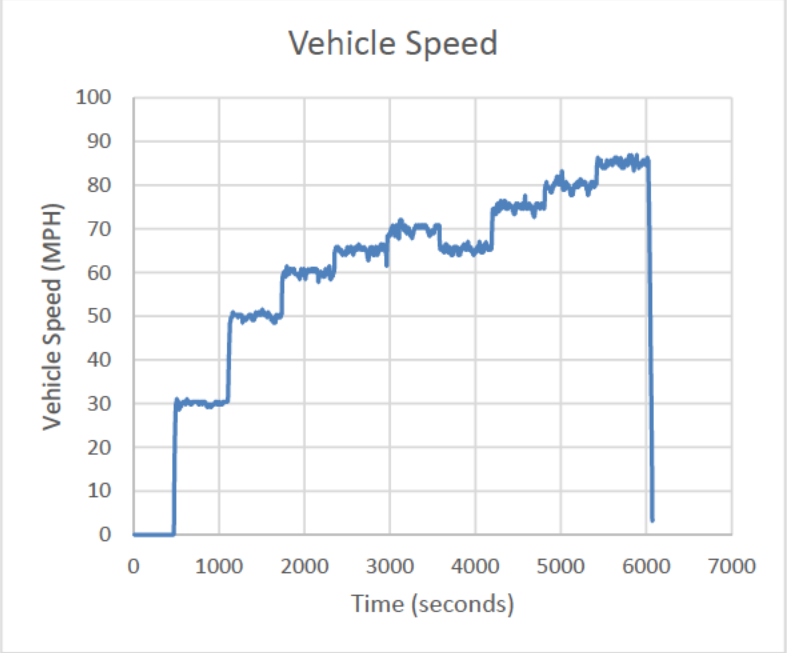


Figure 3.1.7: Vehicle 3 – Steady State Vehicle Speed

ii. 80 MPH Steady State Cruise PEMS Test

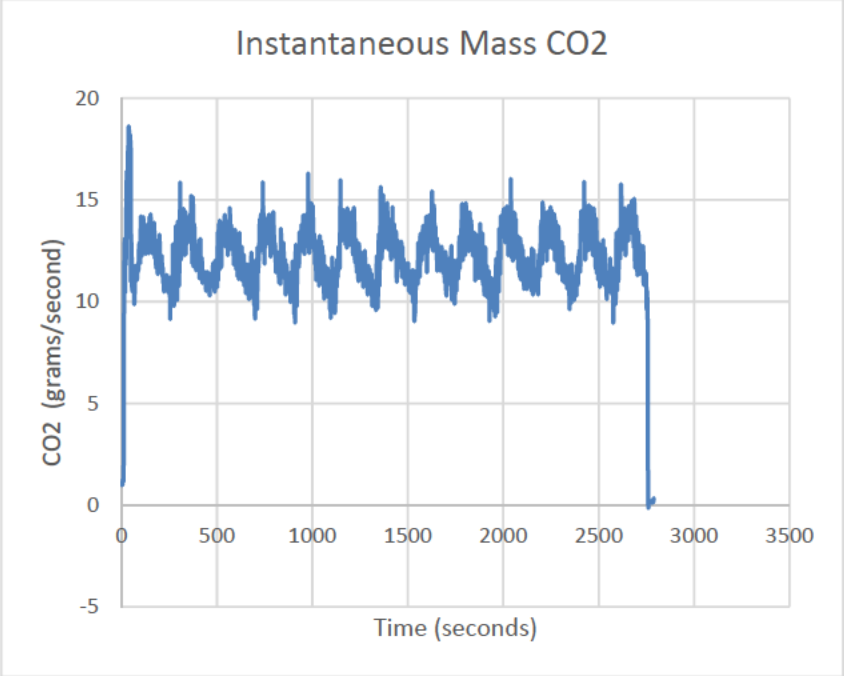


Figure 3.2.1: Vehicle 3 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

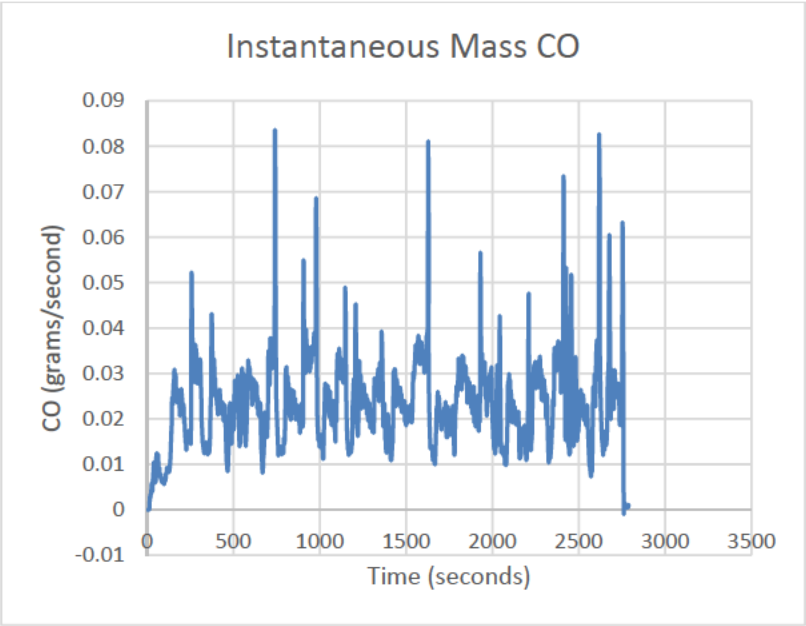


Figure 3.2.2: Vehicle 3 – 80 MPH Steady State Cruise Instantaneous Mass CO

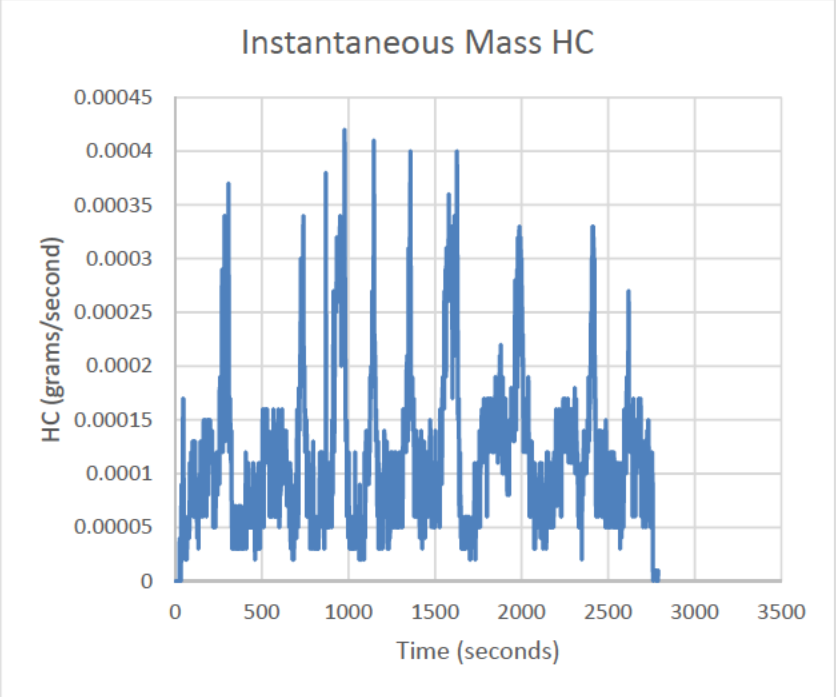


Figure 3.2.3: Vehicle 3 – 80 MPH Steady State Cruise Instantaneous Mass HC

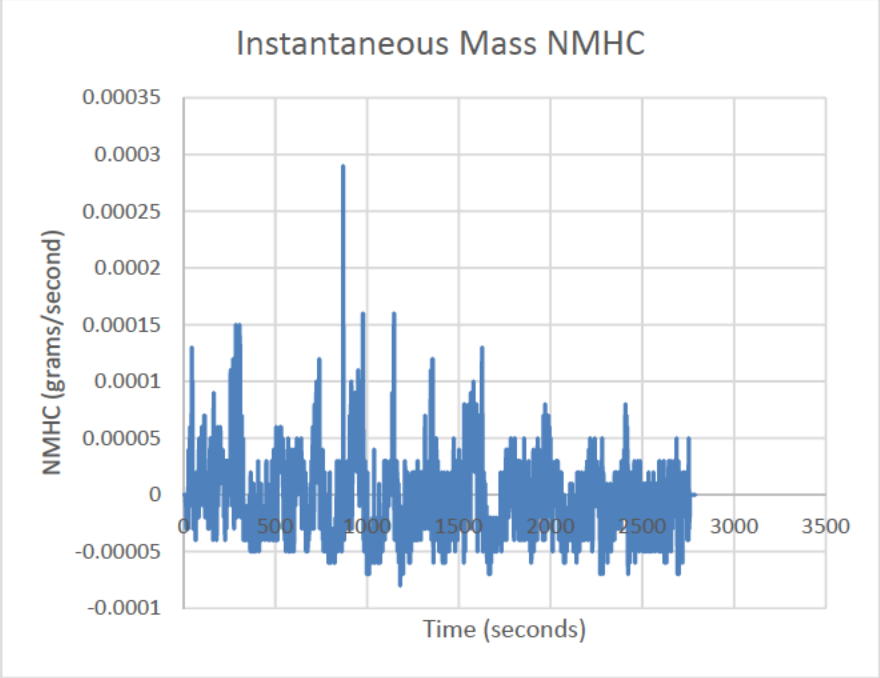


Figure 3.2.4: Vehicle 3 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

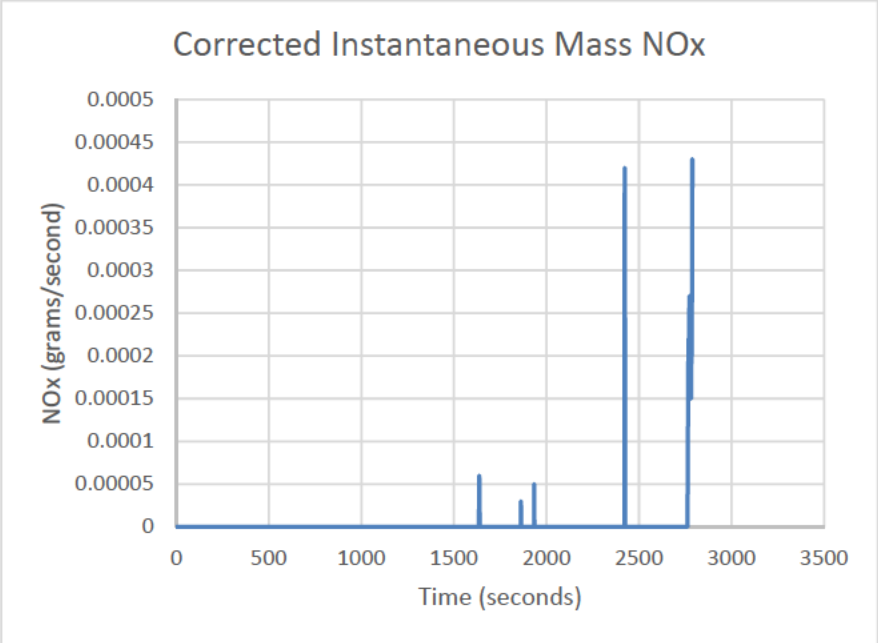


Figure 3.2.5: Vehicle 3 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

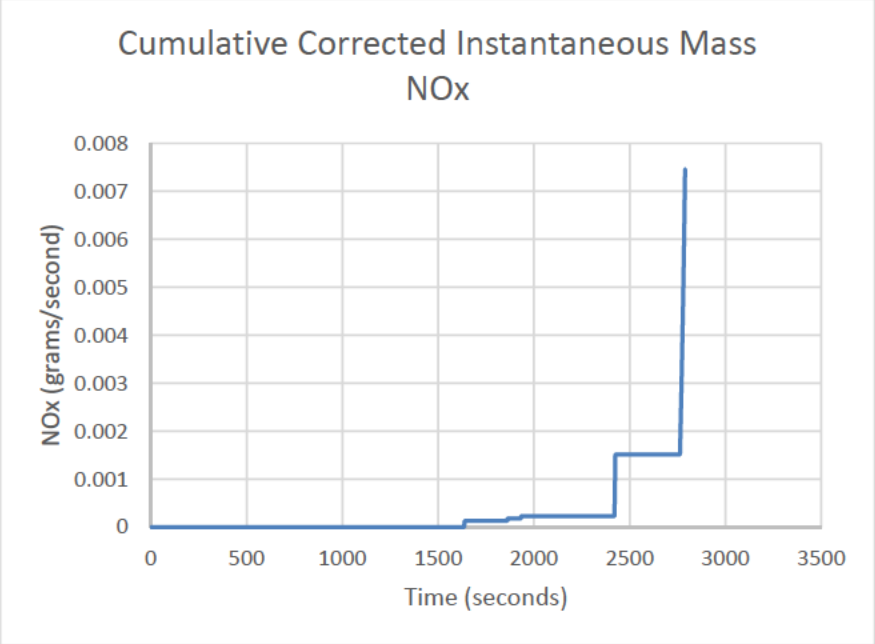


Figure 3.2.6: Vehicle 3 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

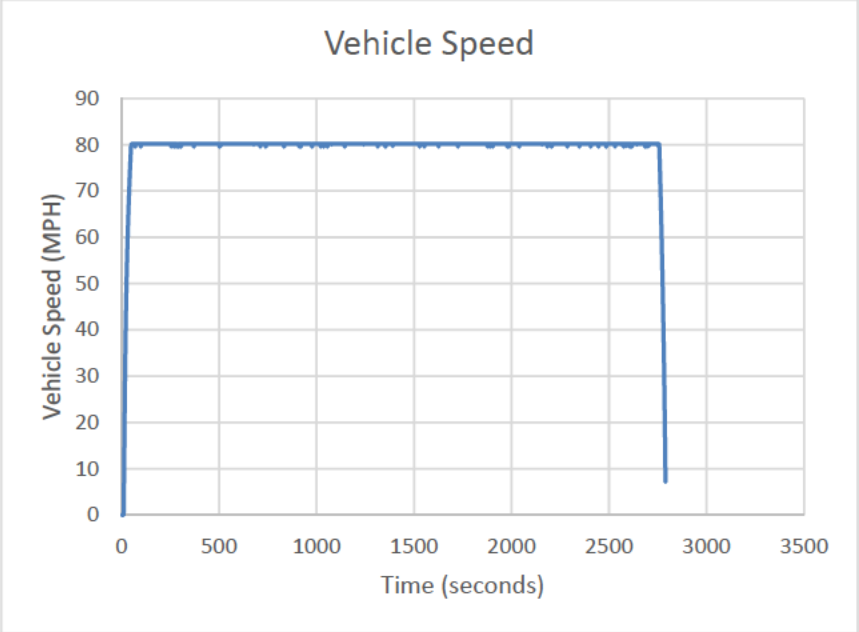


Figure 3.2.7: Vehicle 3 – 80 MPH Steady State Cruise Vehicle Speed

iii. Transient Cycle PEMS Test

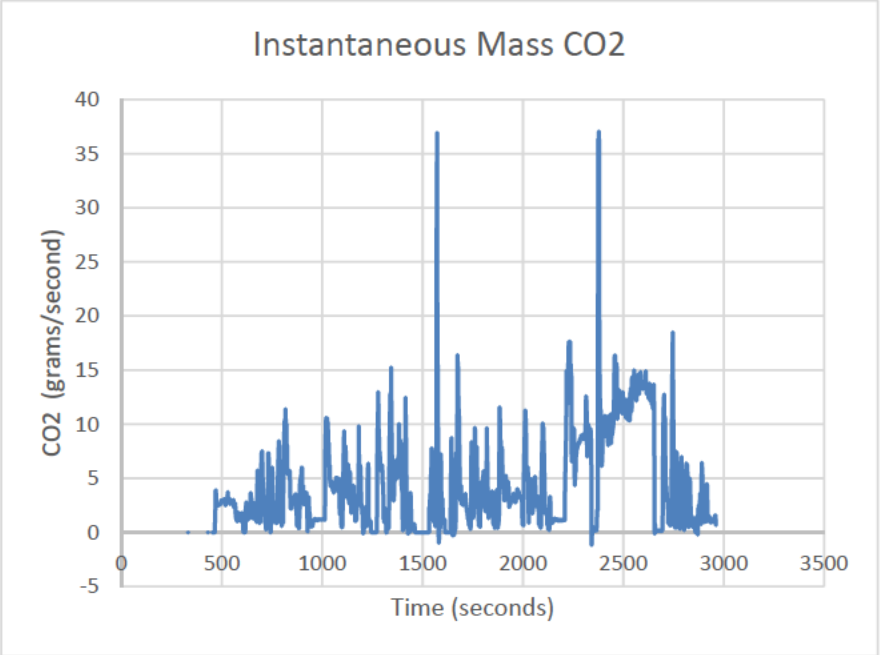


Figure 3.3.1: Vehicle 3 – Transient Cycle Instantaneous Mass CO_2

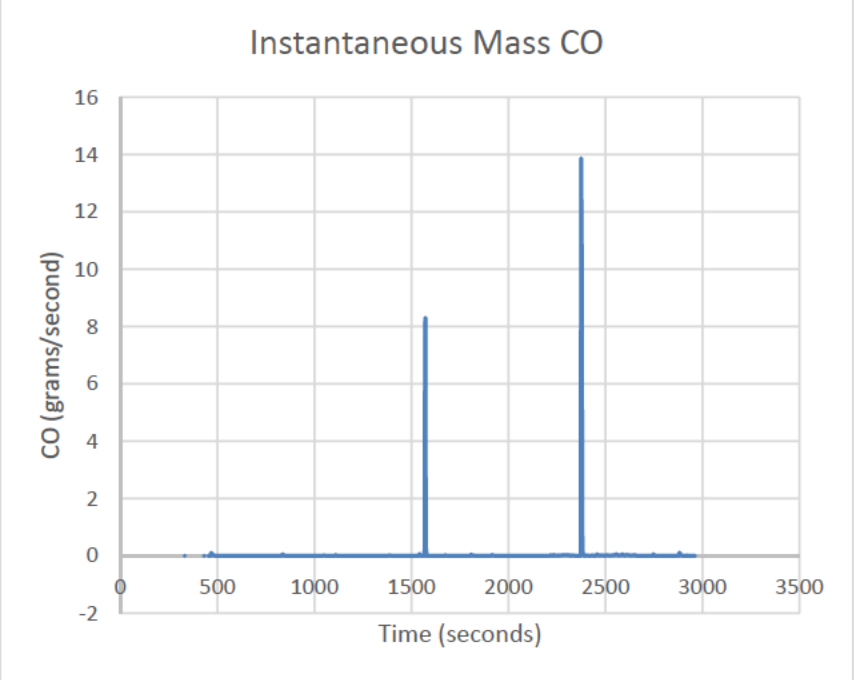


Figure 3.3.2: Vehicle 3 – Transient Cycle Instantaneous Mass CO

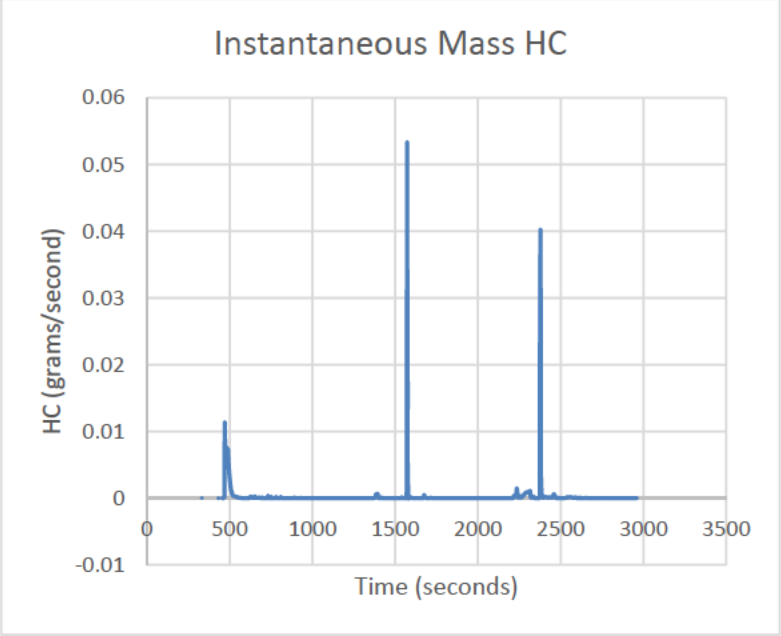


Figure 3.3.3: Vehicle 3 – Transient Cycle Instantaneous Mass HC

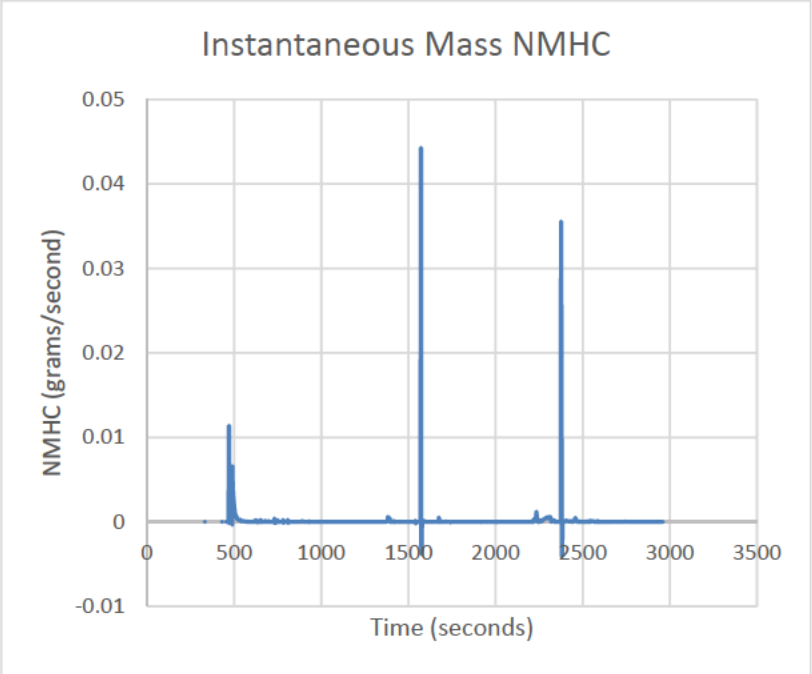


Figure 3.3.4: Vehicle 3 – Transient Cycle Instantaneous Mass NMHC

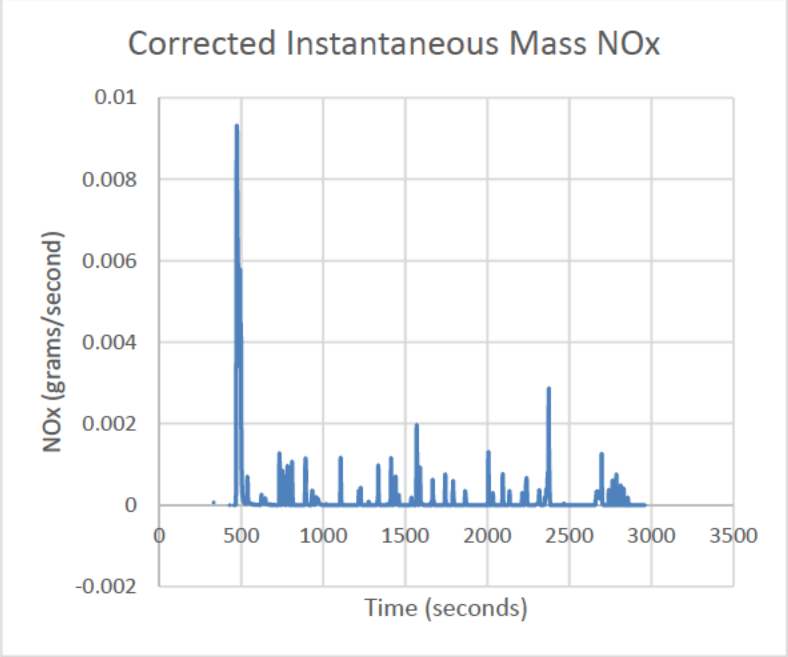


Figure 3.3.5: Vehicle 3 – Transient Cycle Instantaneous Mass NOx

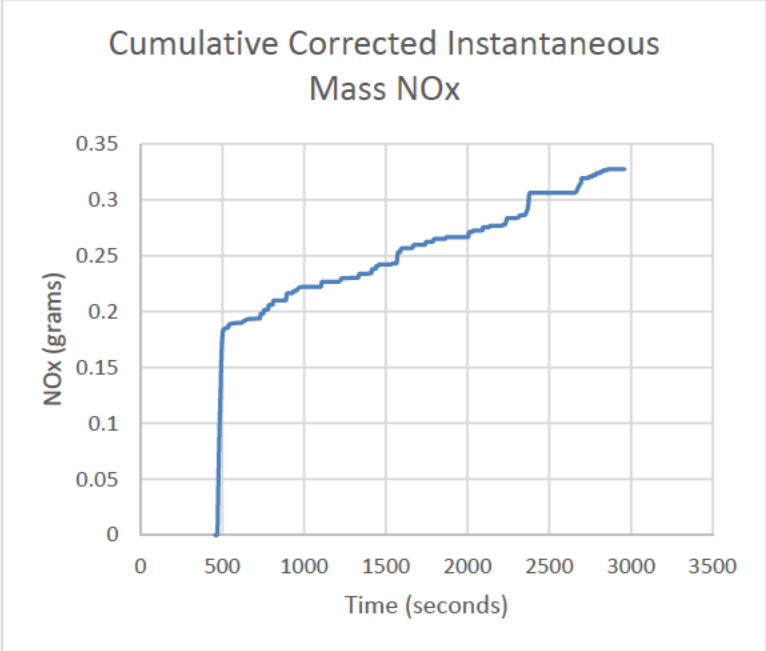


Figure 3.3.6: Vehicle 3 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

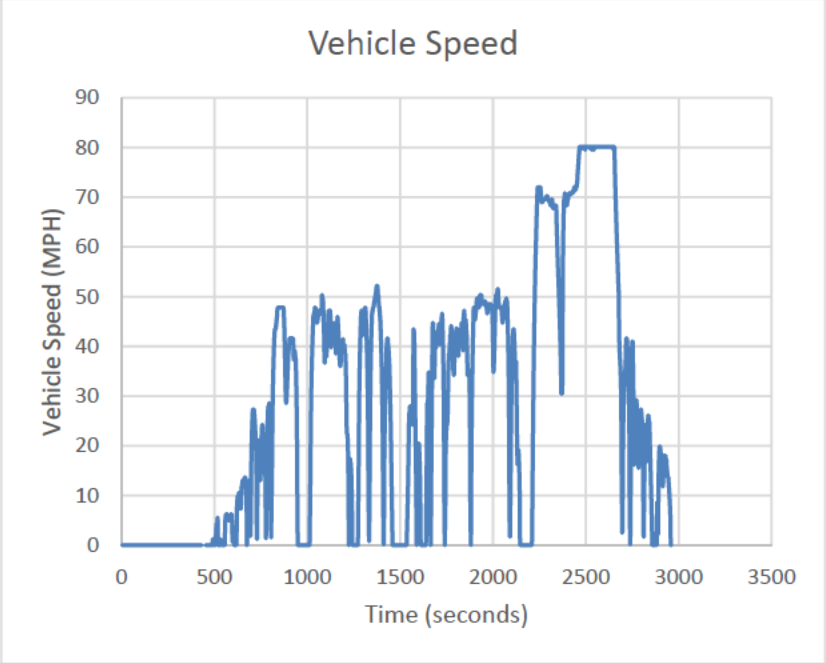


Figure 3.3.7: Vehicle 3 – Transient Cycle Vehicle Speed

4. Vehicle 4 - KCRXT02.45P1- V9KLJ3499 Jeep Cherokee 2.4L ESS 9-speed Automatic AWD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0000	203.9358	0.2152	0.0000	0.0001
50	0.0000	295.5402	0.1180	-0.0006	0.0000
60	0.0000	317.4601	0.4839	-0.0008	0.0006
65	0.0000	343.8344	0.5961	0.0009	0.0056
70	0.0000	343.7891	0.8401	-0.0001	0.0043
65	0.0000	342.0764	0.5399	-0.0010	0.0042
75	0.0000	354.2412	0.8794	-0.0009	0.0049
80	0.0000	392.9763	0.9043	-0.0010	0.0050
85	0.0000	435.4537	3.0217	-0.0005	0.0067
repeat 80	0.0030	390.1782	1.3492	0.0011	0.0031
repeat 85	0.0051	421.7468	1.4293	0.0002	0.0028

Table 4.1: Vehicle 4 – Steady State
File: V9KLJ3499_SSPEMS010519111880
File: V9KLJ3499_SSPEMS010119112680 Repeat

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0000	383.8855	1.2617	0.0007	0.0035

Table 4.2: Vehicle 4 – 80 MPH Steady State Cruise
File: V9KLJ3499_80SS45010219111880

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0027	442.5474	3.8054	0.0085	0.0153

Table 4.3: Vehicle 4 – Transient Cycle
File: V9KLJ3499_P-IUVP010119111780

b. Summary Plots

i. Steady State PEMS Test

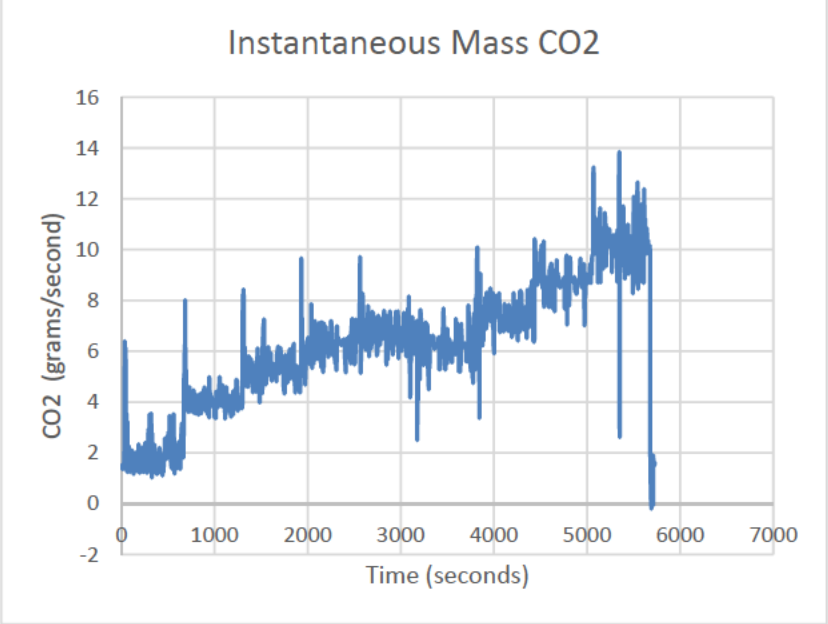


Figure 4.1.1: Vehicle 4 – Steady State Instantaneous Mass CO_2

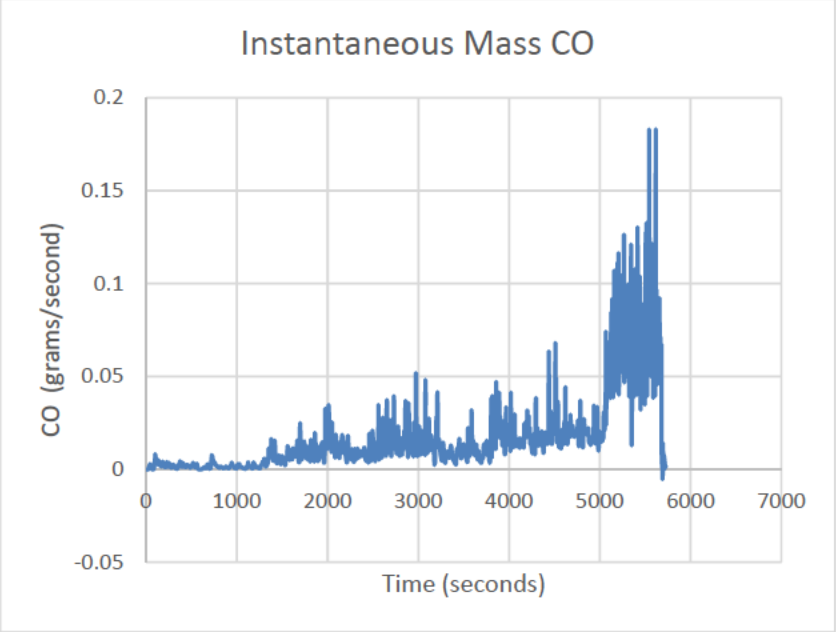


Figure 4.1.2: Vehicle 4 – Steady State Instantaneous Mass CO

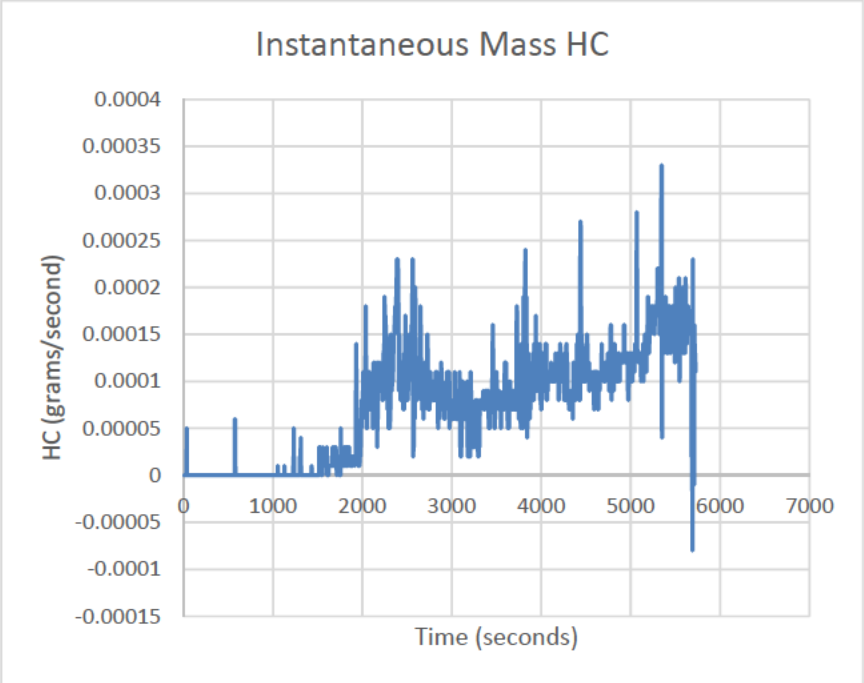


Figure 4.1.3: Vehicle 4 – Steady State Instantaneous Mass HC

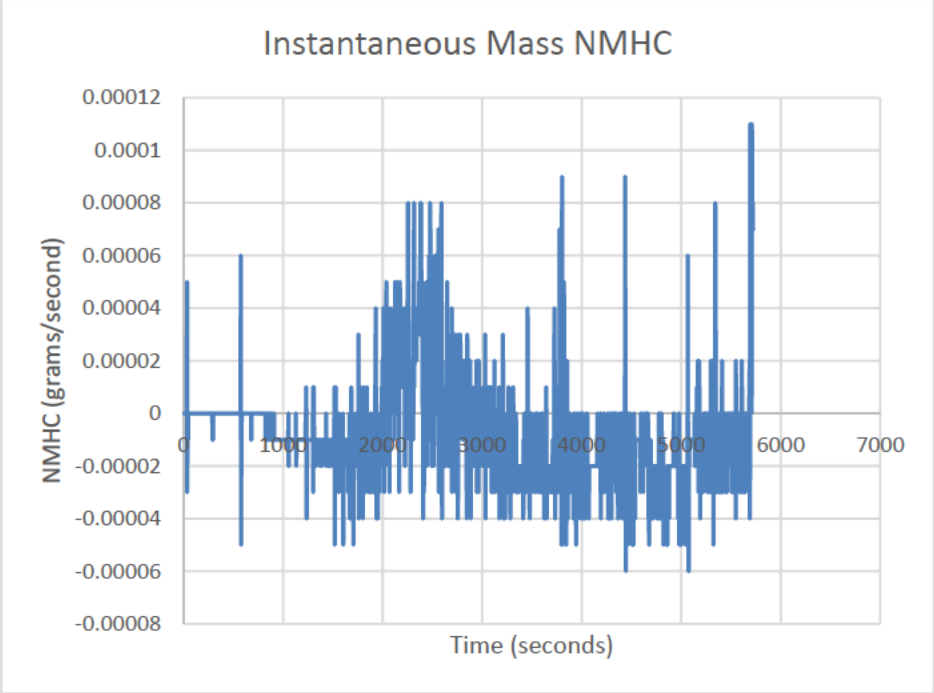


Figure 4.1.4: Vehicle 4 – Steady State Instantaneous Mass NMHC

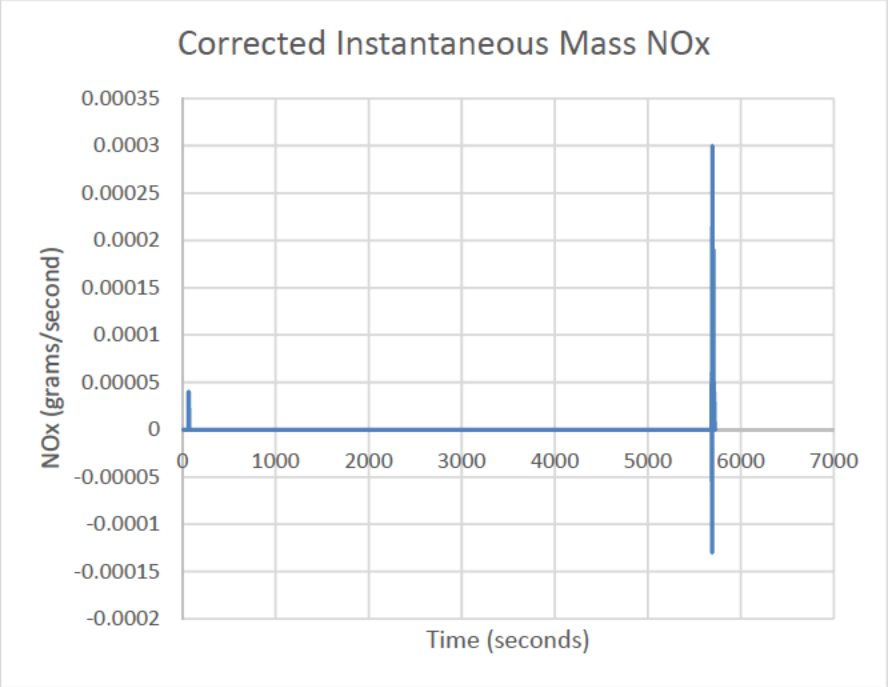


Figure 4.1.5: Vehicle 4 – Steady State Corrected Instantaneous Mass NOx

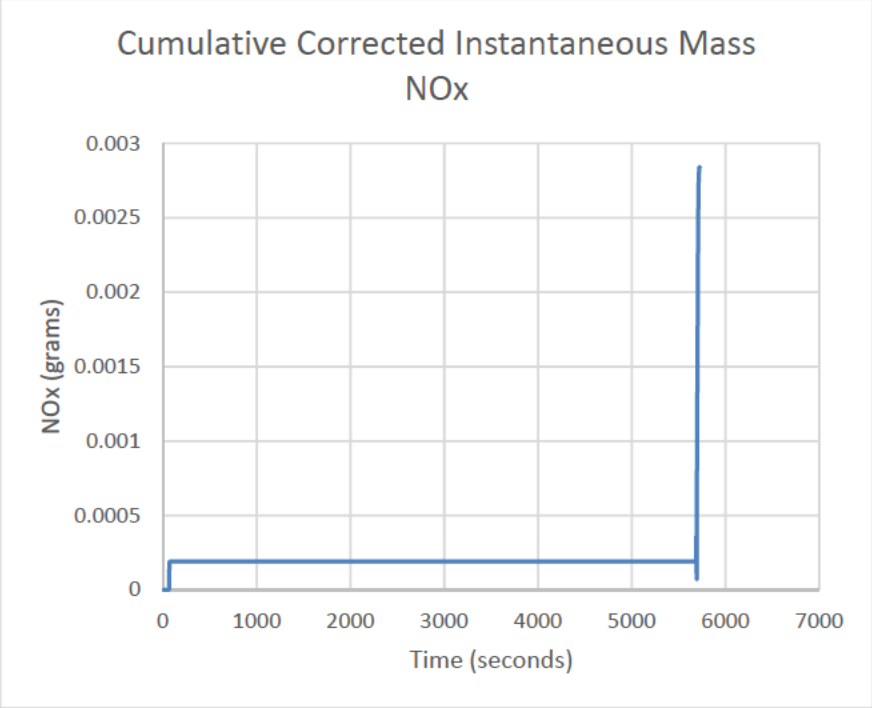


Figure 4.1.6: Vehicle 4 – Steady State Cumulative Corrected Instantaneous Mass NOx

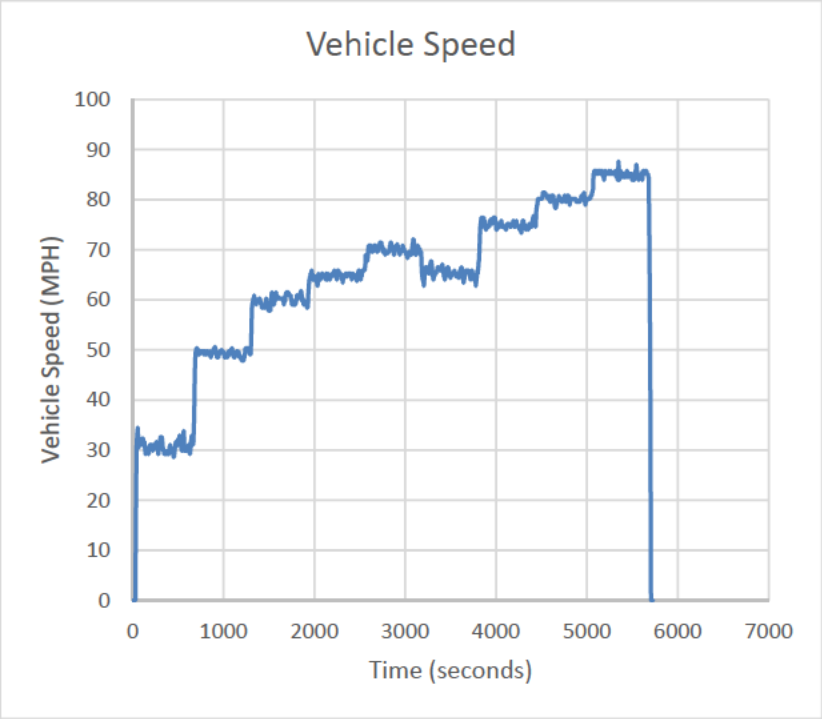


Figure 4.1.7: Vehicle 4 – Steady State Vehicle Speed

ii. Steady State PEMS Test – Repeat

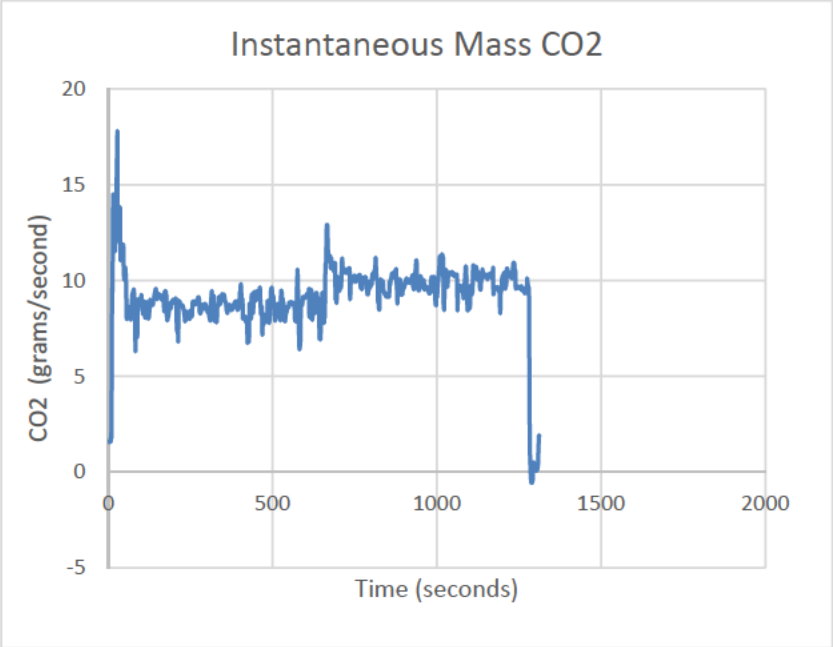


Figure 4.1.1.1: Vehicle 4 – Steady State Instantaneous Mass CO_2

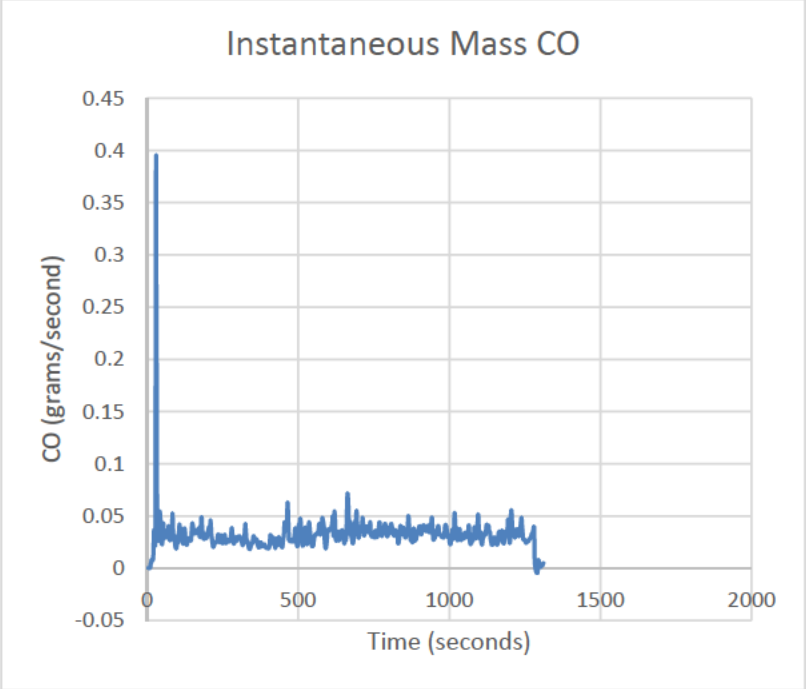


Figure 4.1.2.1: Vehicle 4 – Steady State Instantaneous Mass CO

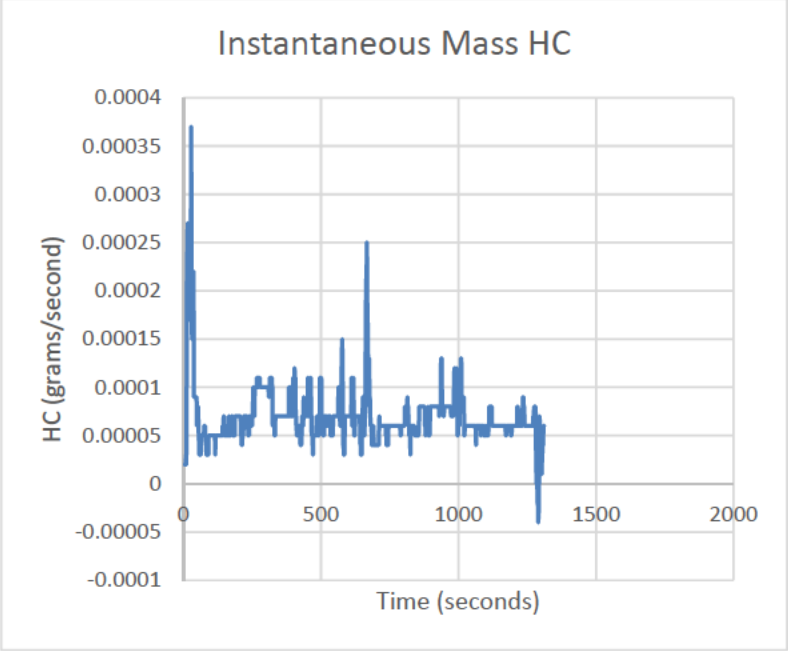


Figure 4.1.3.1: Vehicle 4 – Steady State Instantaneous Mass HC

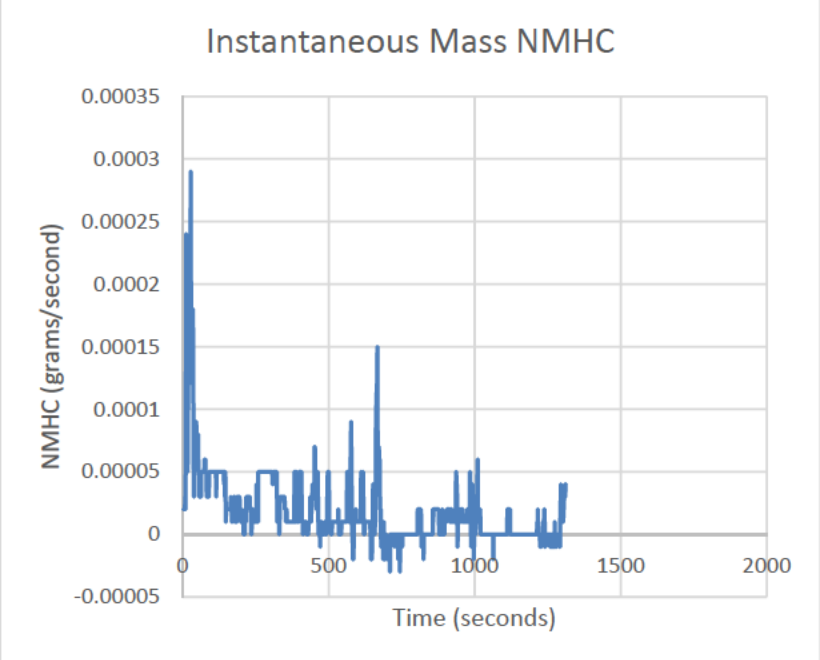


Figure 4.1.4.1: Vehicle 4 – Steady State Instantaneous Mass NMHC

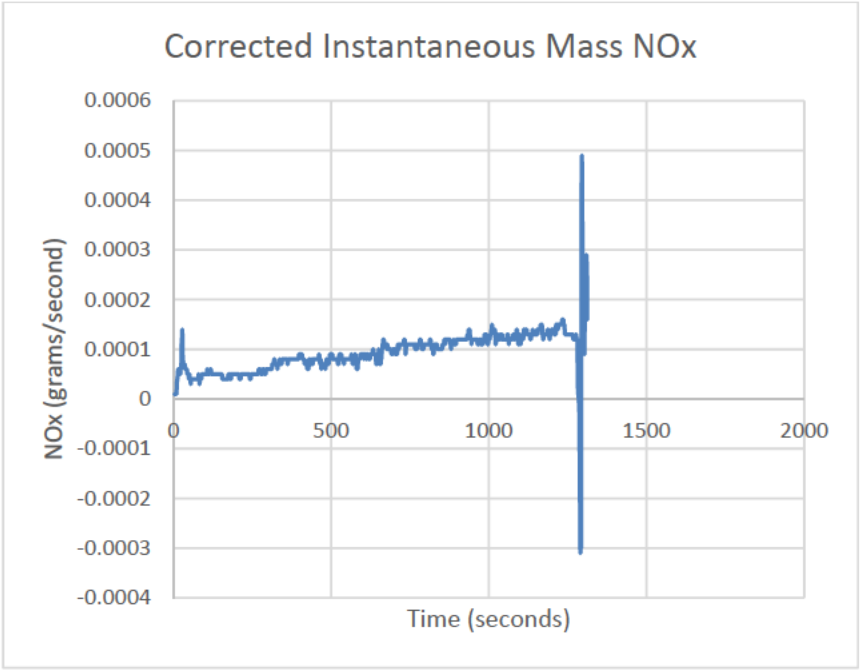


Figure 4.1.5.1: Vehicle 4 – Steady State Corrected Instantaneous Mass NOx

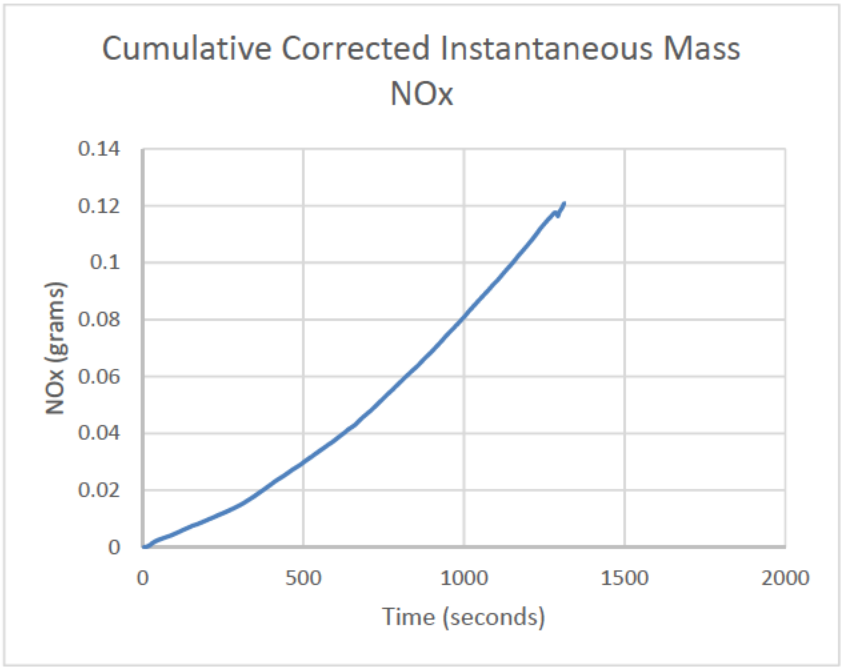


Figure 4.1.6.1: Vehicle 4 – Steady State Cumulative Corrected Instantaneous Mass NOx

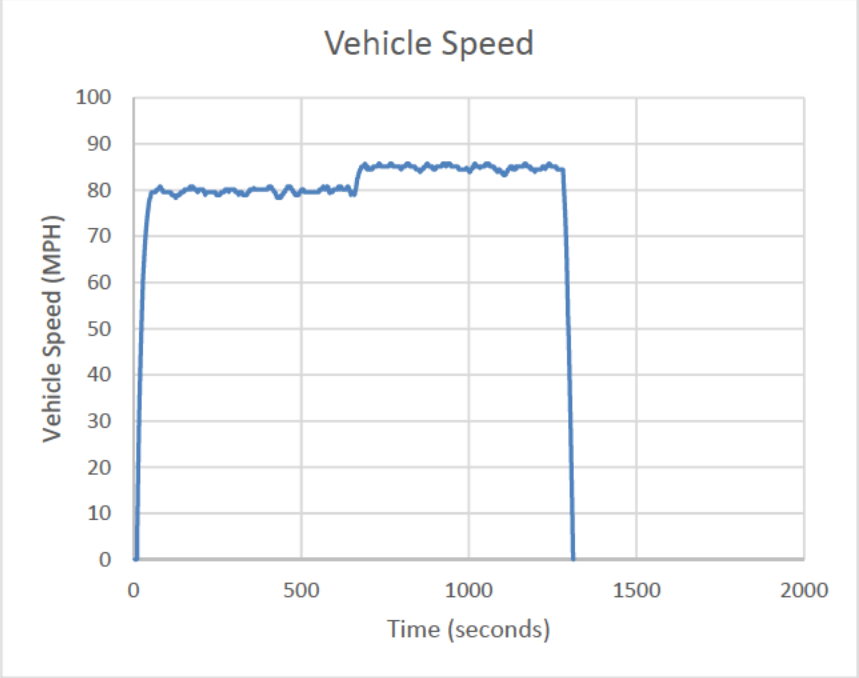


Figure 4.1.7.1: Vehicle 4 – Steady State Vehicle Speed

iii. 80 MPH Steady State PEMS Test

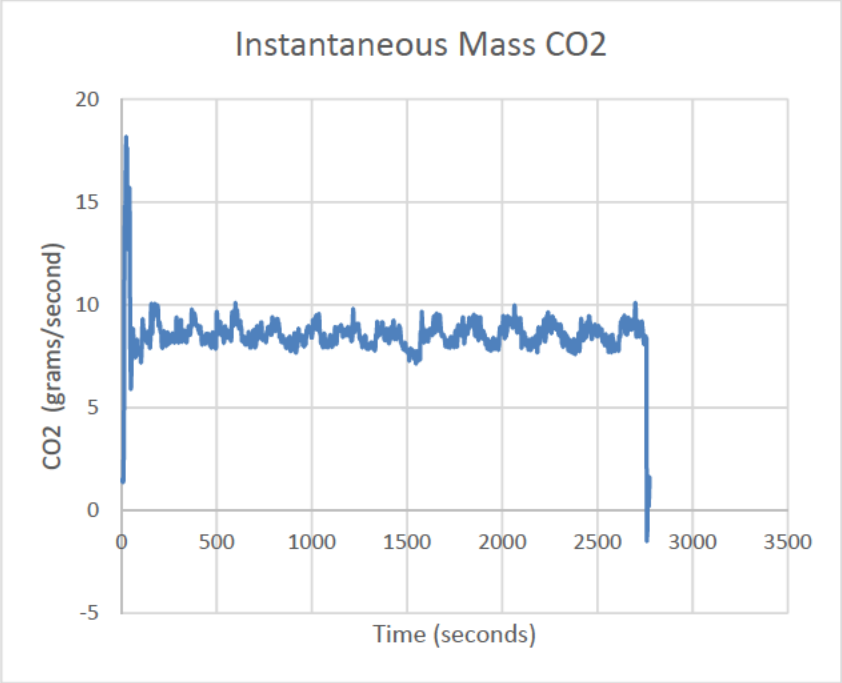


Figure 4.2.1: Vehicle 4 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

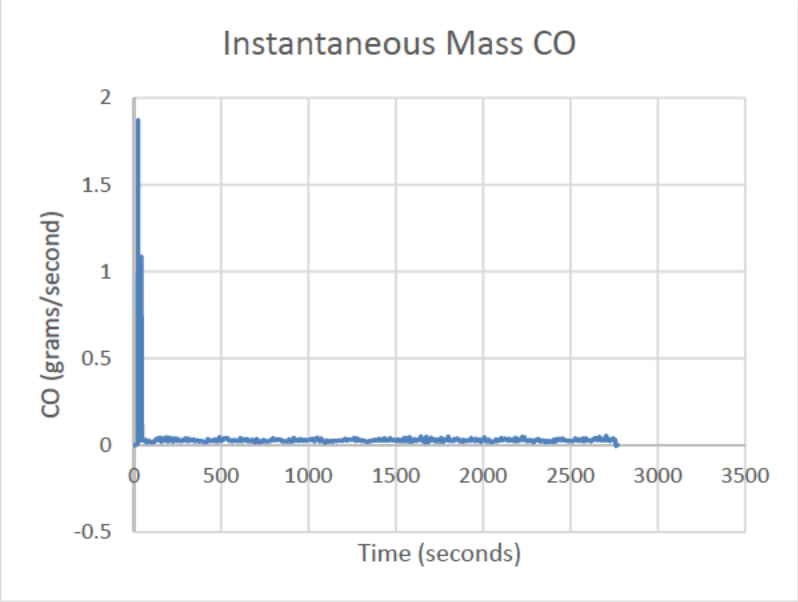


Figure 4.2.2: Vehicle 4 – 80 MPH Steady State Cruise Instantaneous Mass CO

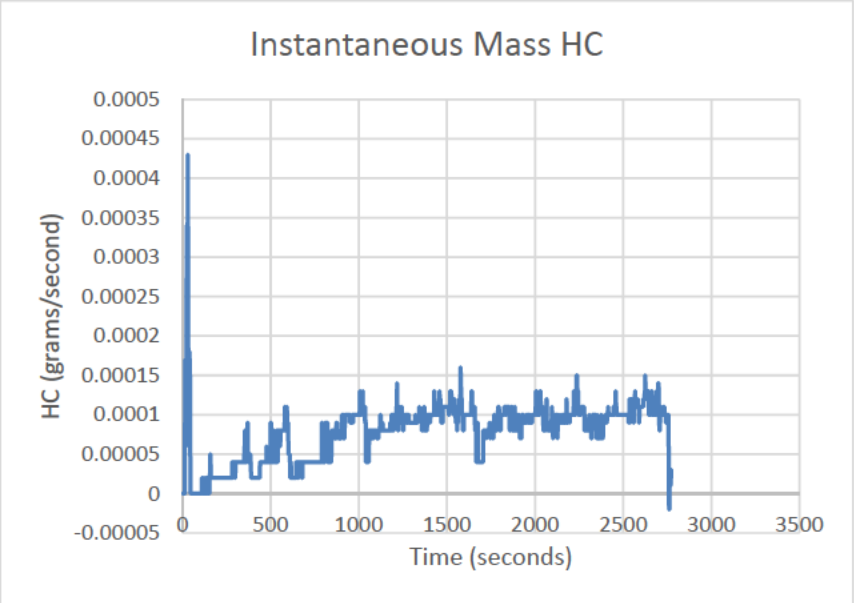


Figure 4.2.3: Vehicle 4 – 80 MPH Steady State Cruise Instantaneous Mass HC

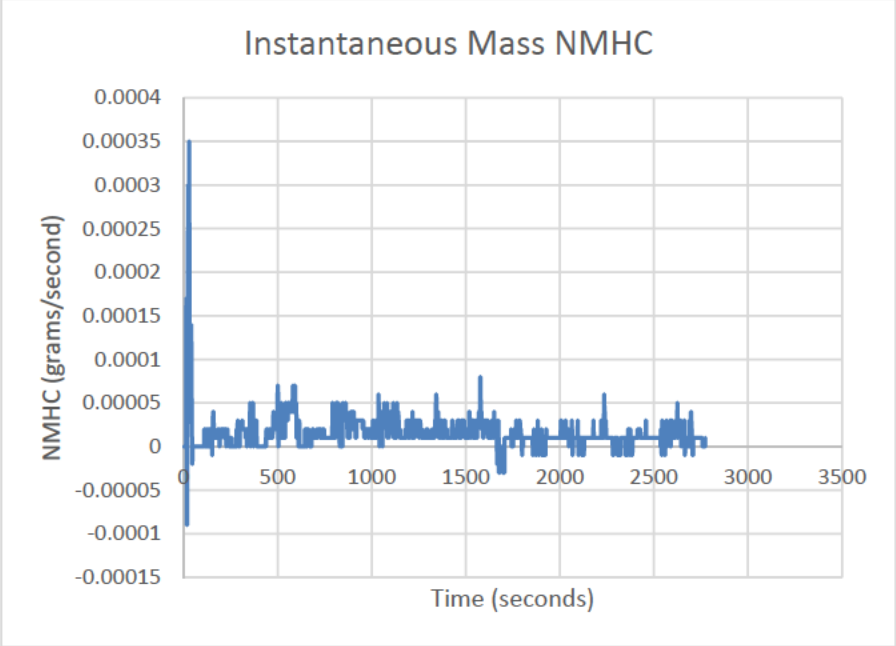


Figure 4.2.4: Vehicle 4 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

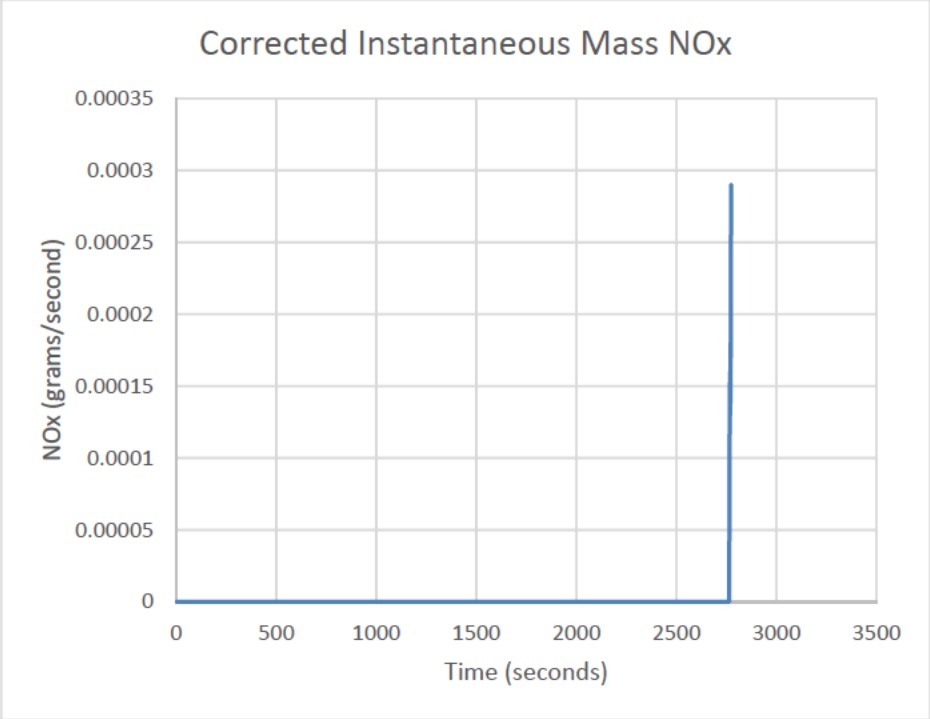


Figure 4.2.5: Vehicle 4 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

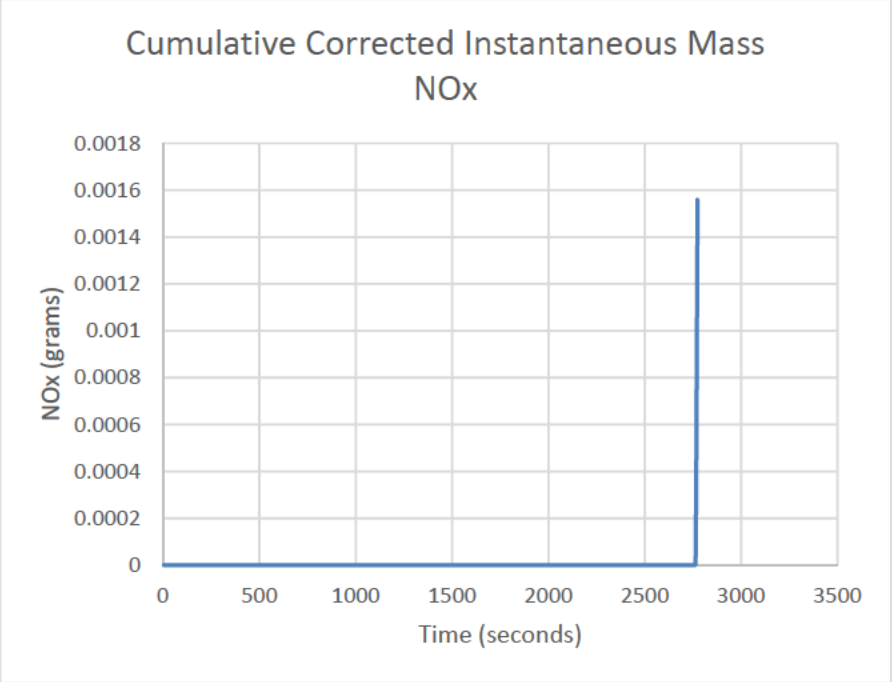


Figure 4.2.6: Vehicle 4 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

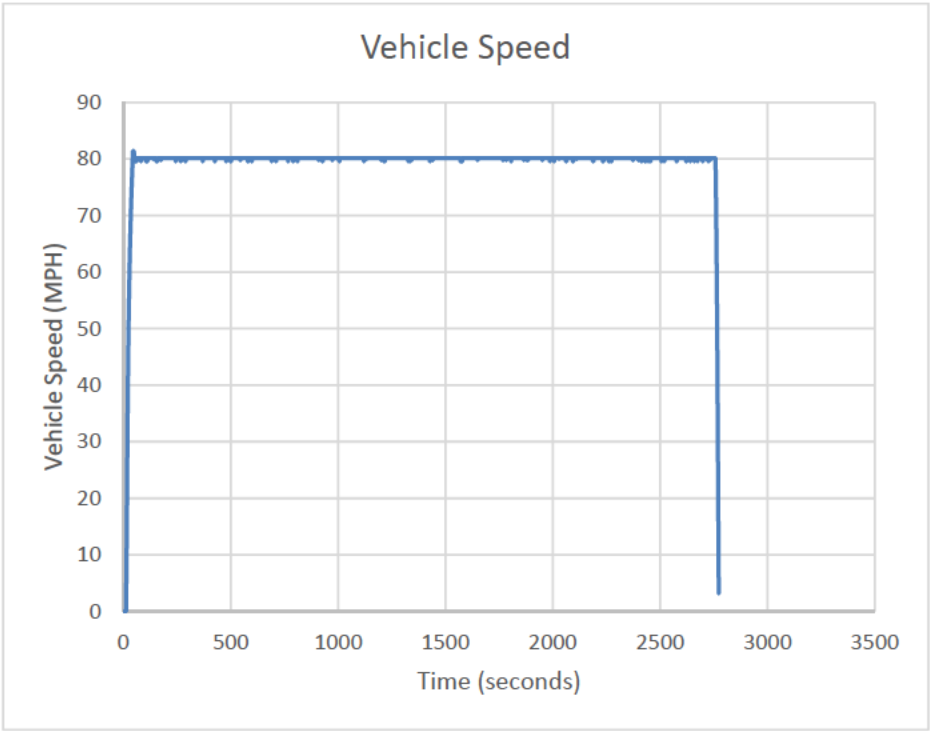


Figure 4.2.7: Vehicle 4 – 80 MPH Steady State Cruise Vehicle Speed

iv. Transient Cycle PEMS Test

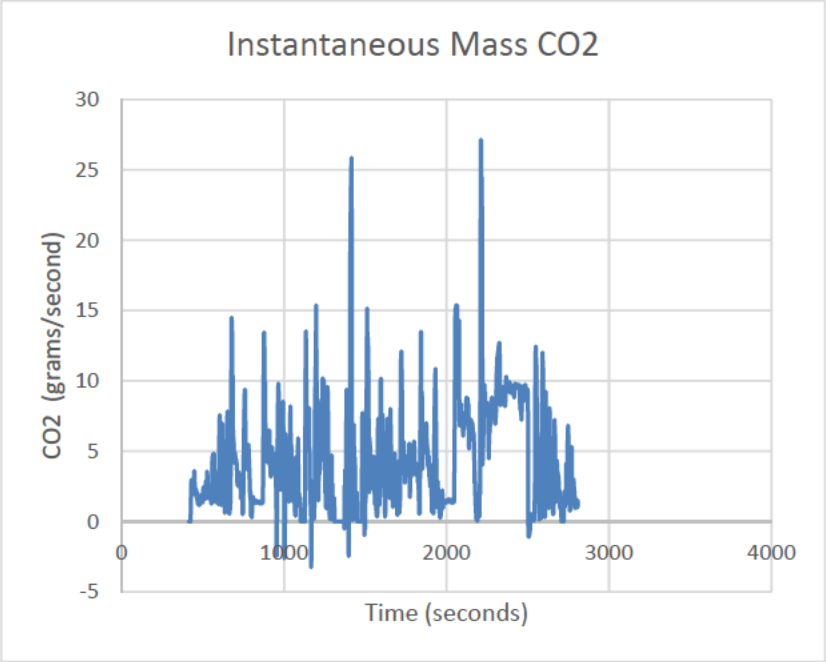


Figure 4.3.1: Vehicle 4 – Transient Cycle Instantaneous Mass CO_2

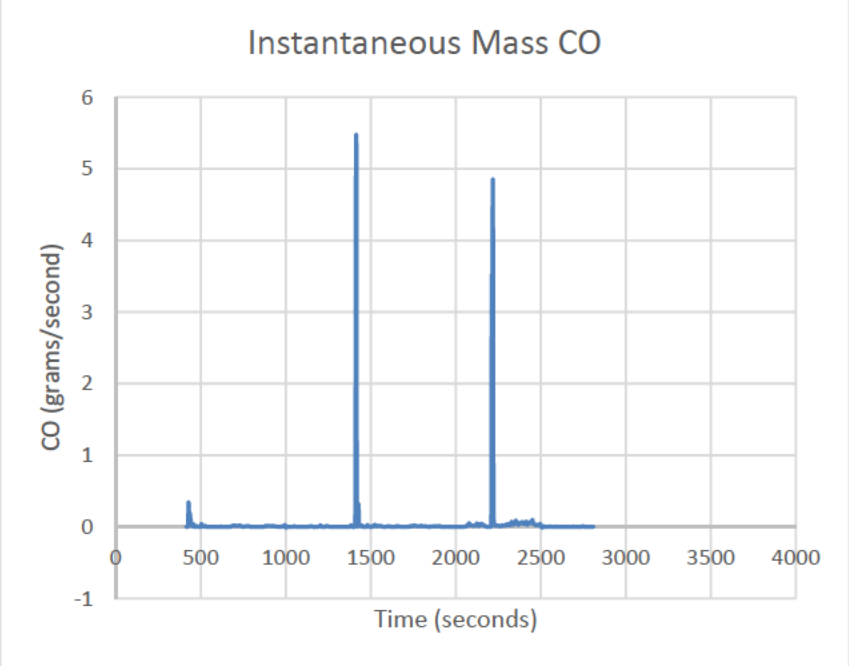


Figure 4.3.2: Vehicle 4 – Transient Cycle Instantaneous Mass CO

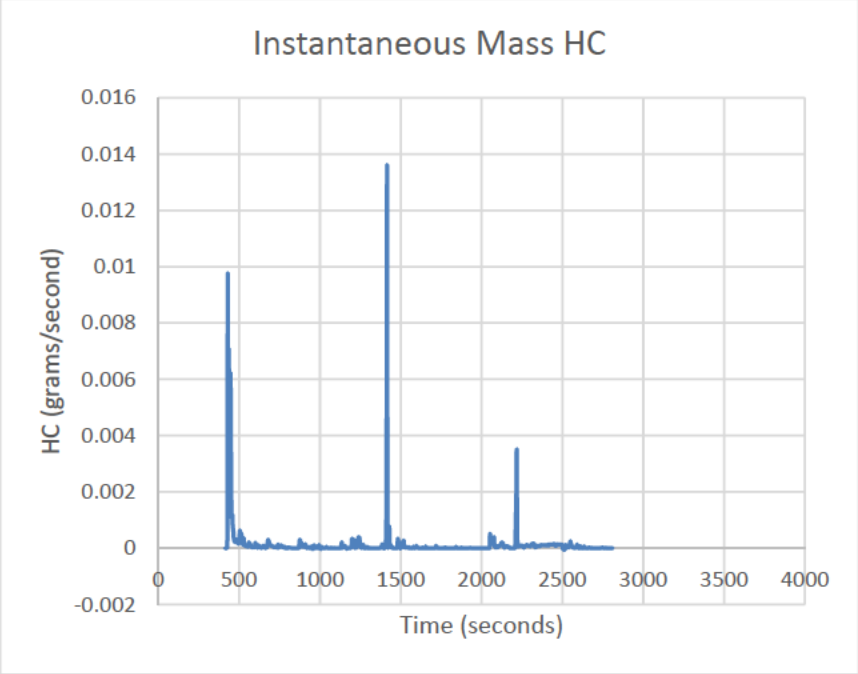


Figure 4.3.3: Vehicle 4 – Transient Cycle Instantaneous Mass HC

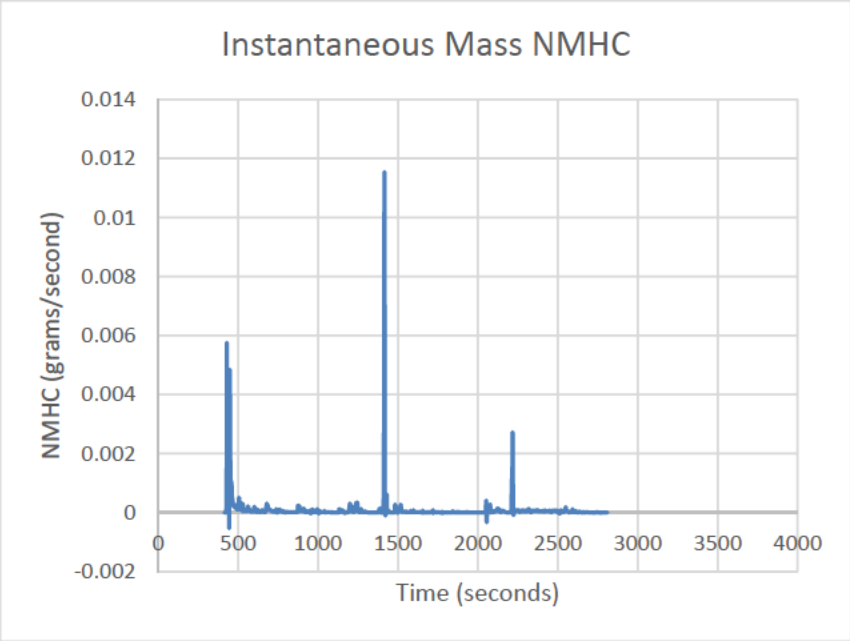


Figure 4.3.4: Vehicle 4 – Transient Cycle Instantaneous Mass NMHC

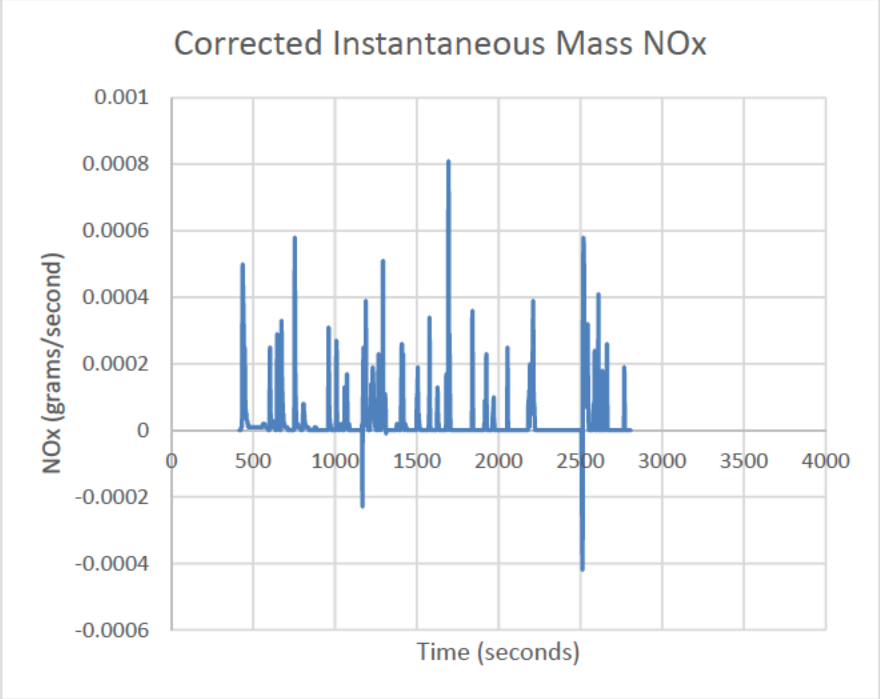


Figure 4.3.5: Vehicle 4 – Transient Cycle Instantaneous Mass NOx

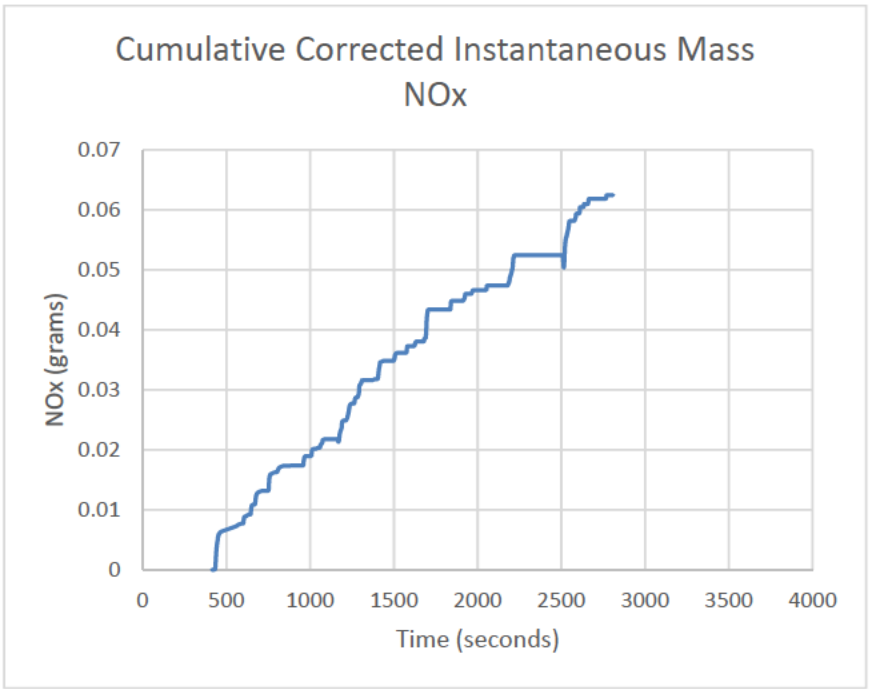


Figure 4.3.6: Vehicle 4 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

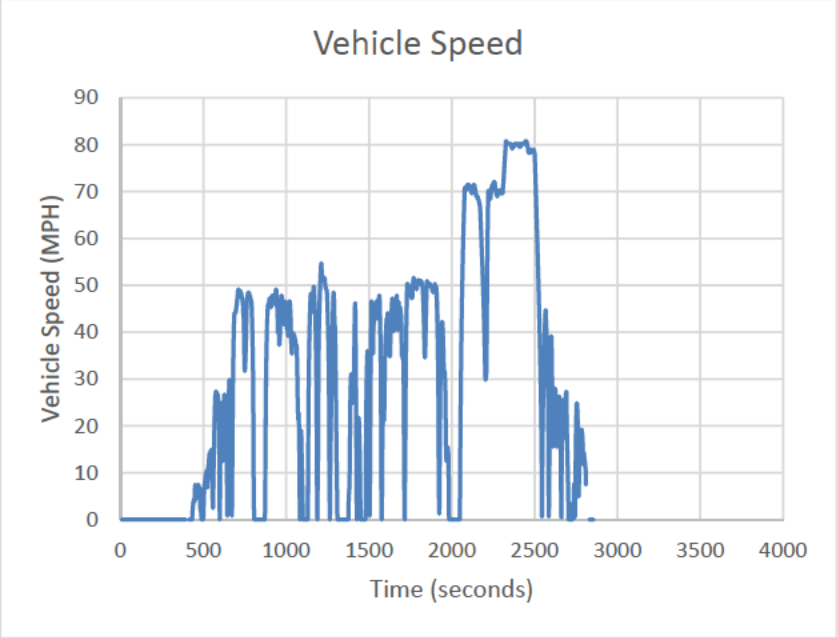


Figure 4.3.7: Vehicle 4 – Transient Cycle Vehicle Speed

5. Vehicle 5 - KCRXT02.45P4 - V9BVJ6280 Jeep Renegade 2.4L 9-speed AUTOMATIC AWD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0000	194.2919	0.0829	0.0006	0.0006
50	0.0000	227.6691	0.0610	0.0003	0.0010
60	0.0006	280.3820	0.1355	0.0005	0.0018
65	0.0000	309.5930	0.2608	0.0003	0.0023
70	0.0000	326.8410	0.3663	0.0002	0.0034
65	0.0000	301.8607	0.2486	0.0001	0.0034
75	0.0000	348.0048	0.4767	0.0003	0.0045
80	0.0051	375.3427	0.6109	0.0001	0.0047
85	0.0035	416.8267	0.9173	0.0001	0.0051

Table 5.1: Vehicle 5 – Steady State
File: V9BVJ6280_SSPEMS010319103180

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0619	383.8714	0.5596	-0.0011	0.0020
Repeat 80	0.0060	402.0190	0.5927	-0.0007	0.0018

Table 5.2: Vehicle 5 – 80 MPH Steady State Cruise
File: V9BVJ6280_80SS45010219103180
File: V9BVJ6280_80SS45010319110780 - Repeat

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0056	395.6192	2.2063	0.0038	0.0087

Table 5.3: Vehicle 5 – Transient Cycle
File: V9BVJ6280_P-IUVP010119103180

b. Summary Plots

i. Steady State PEMS Test

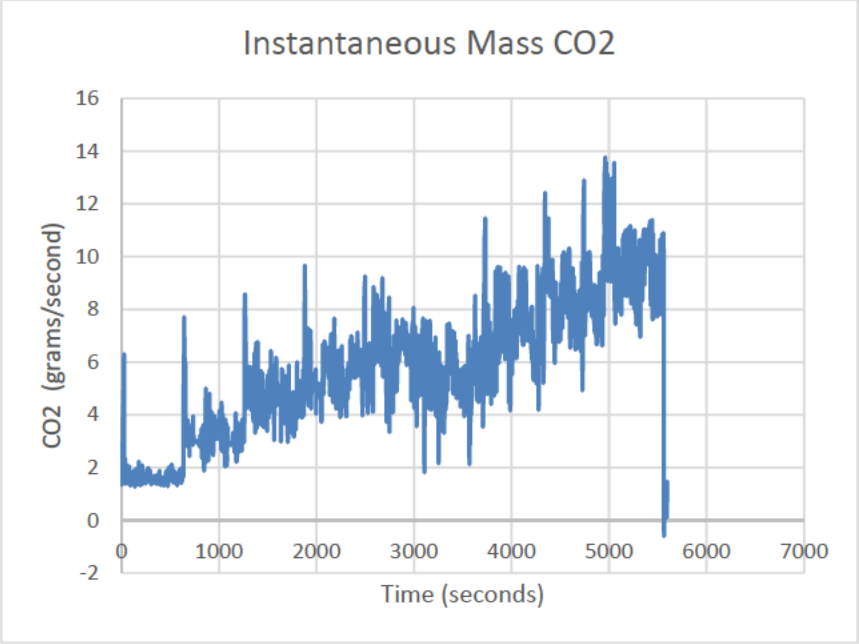


Figure 5.1.1: Vehicle 5 – Steady State Instantaneous Mass CO_2

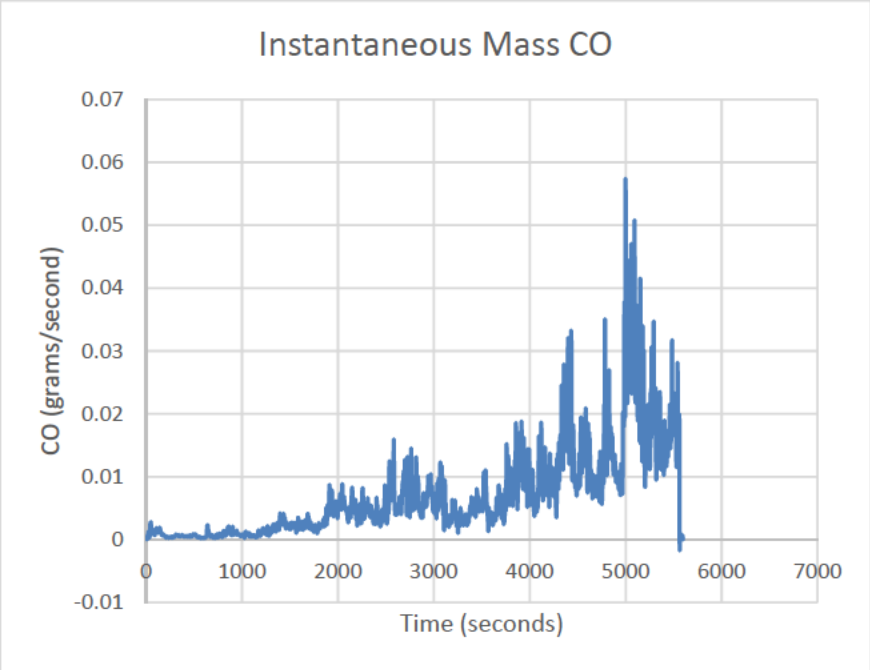


Figure 5.1.2: Vehicle 5 – Steady State Instantaneous Mass CO

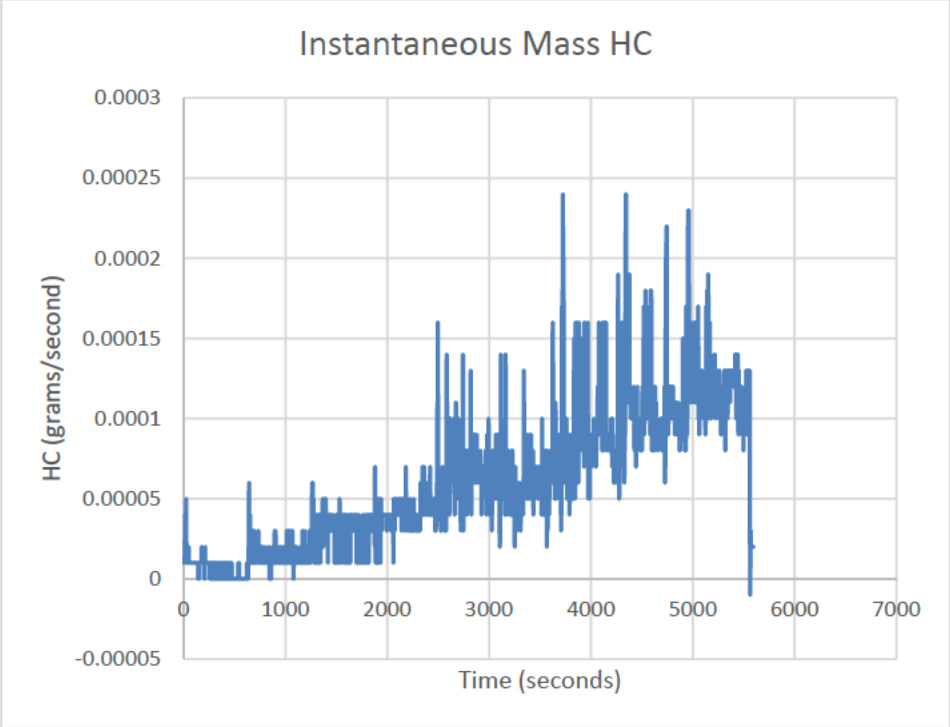


Figure 5.1.3: Vehicle 5 – Steady State Instantaneous Mass HC

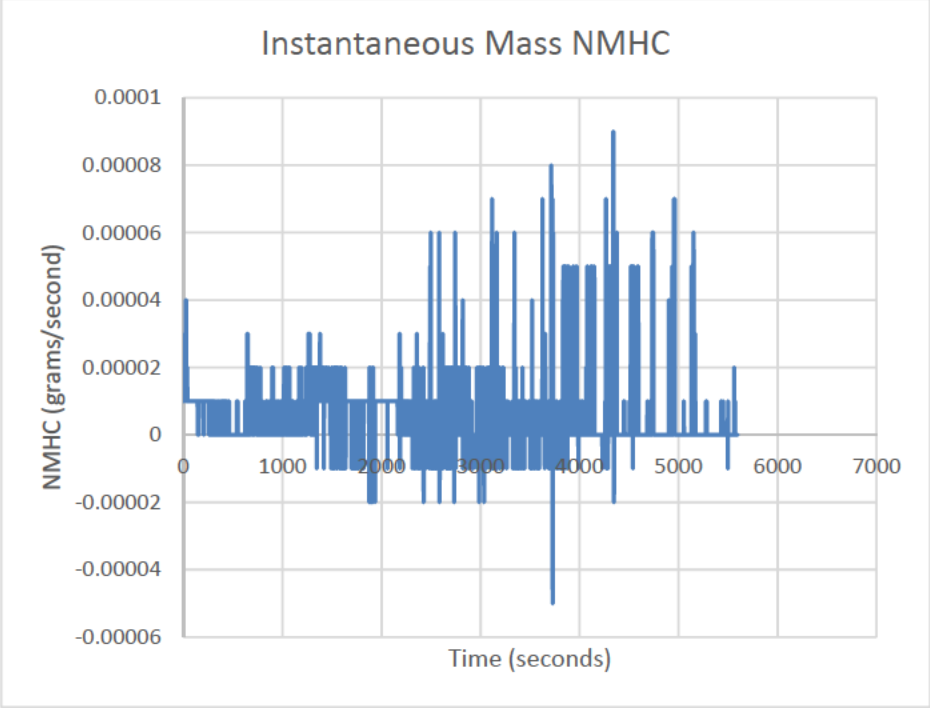


Figure 5.1.4: Vehicle 5 – Steady State Instantaneous Mass NMHC

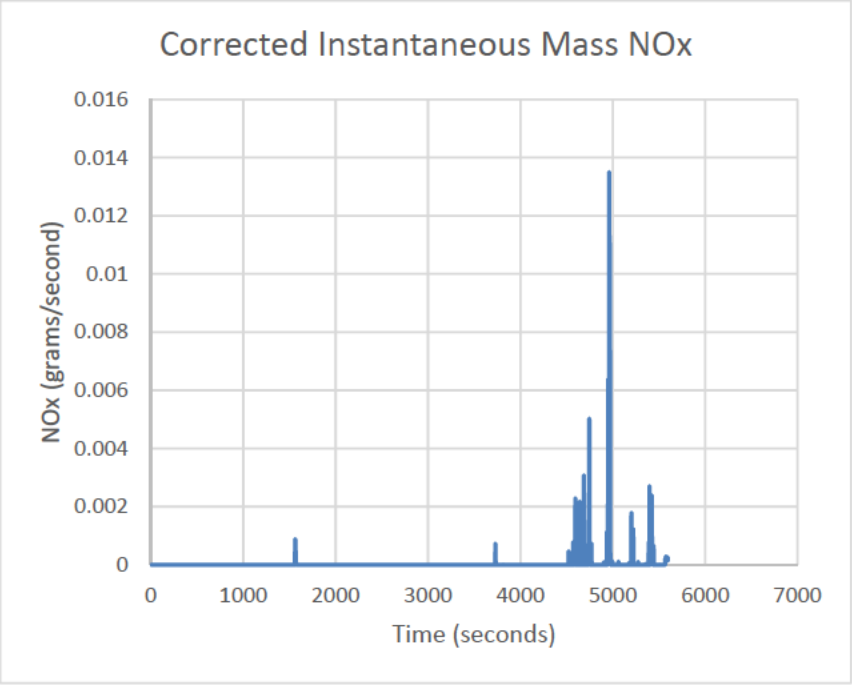


Figure 5.1.5: Vehicle 5 – Steady State Corrected Instantaneous Mass NOx

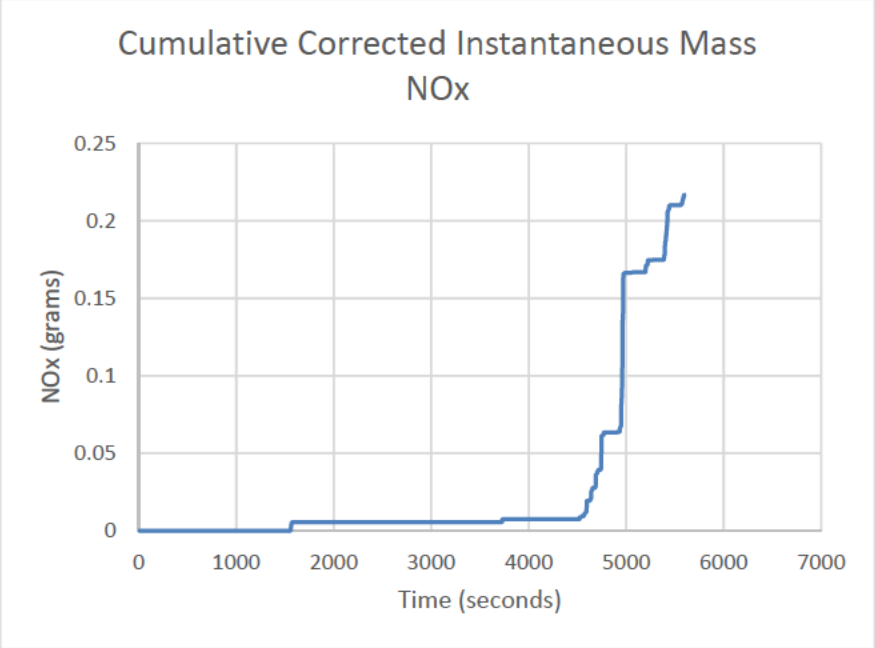


Figure 5.1.6: Vehicle 5 – Steady State Cumulative Corrected Instantaneous Mass NOx

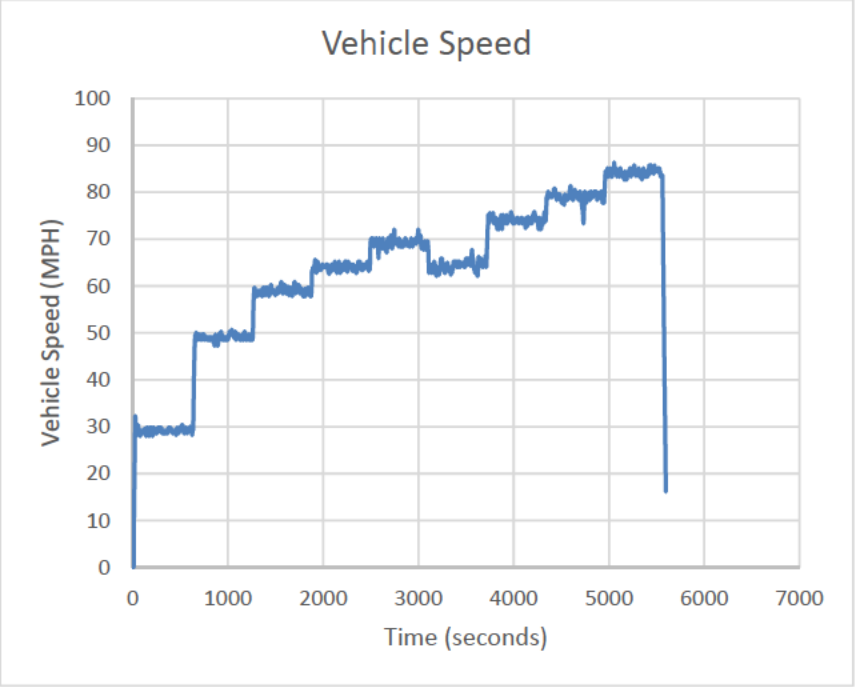


Figure 5.1.7: Vehicle 5 – Steady State Vehicle Speed

ii. 80 MPH Steady State Cruise PEMS Test

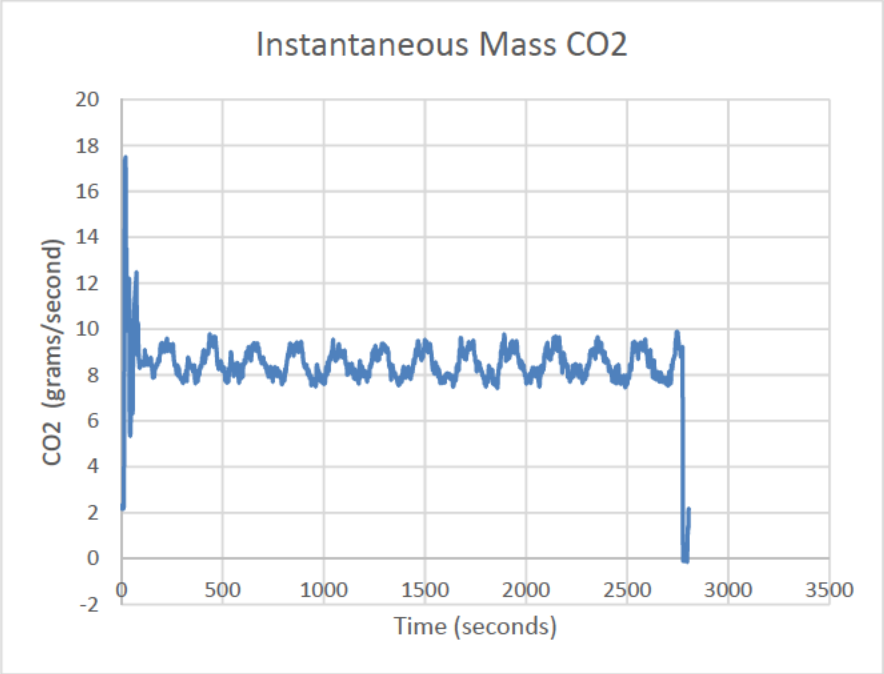


Figure 5.2.1: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

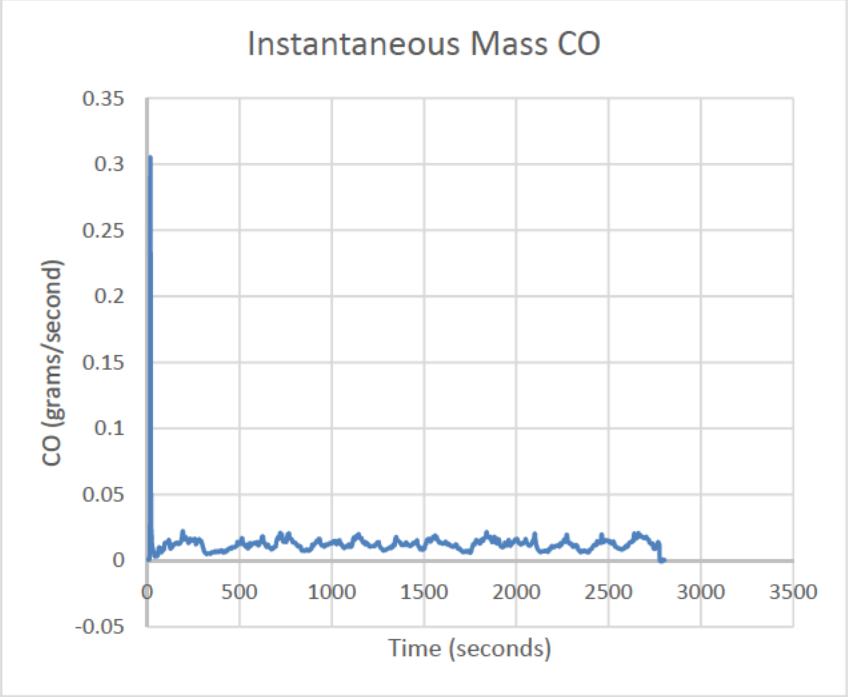


Figure 5.2.2: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass CO

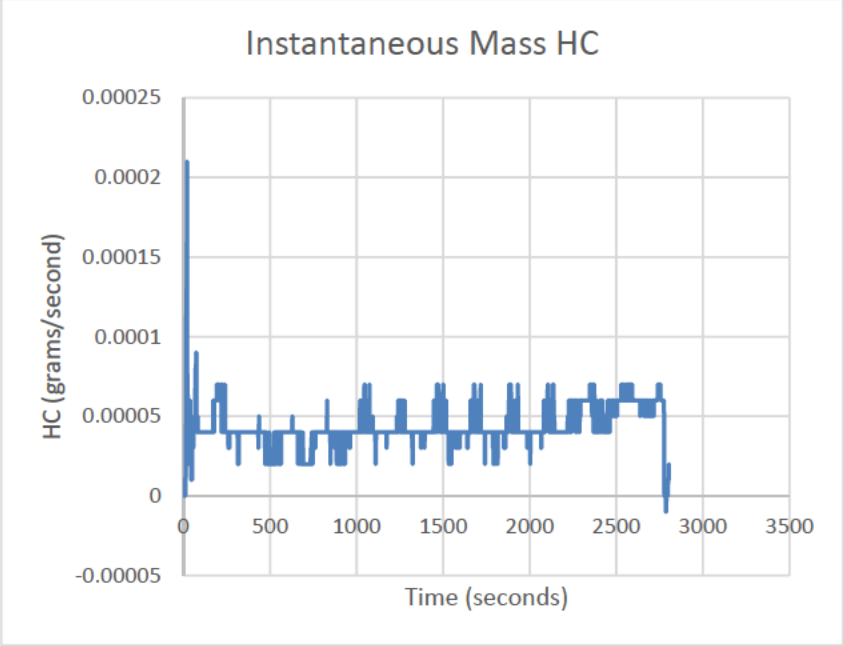


Figure 5.2.3: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass HC

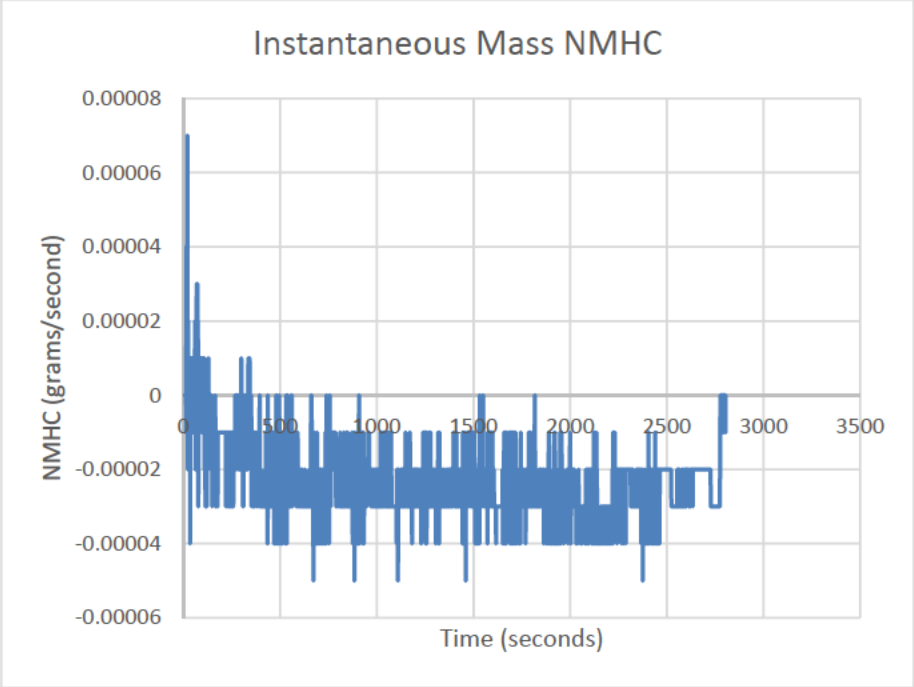


Figure 5.2.4: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

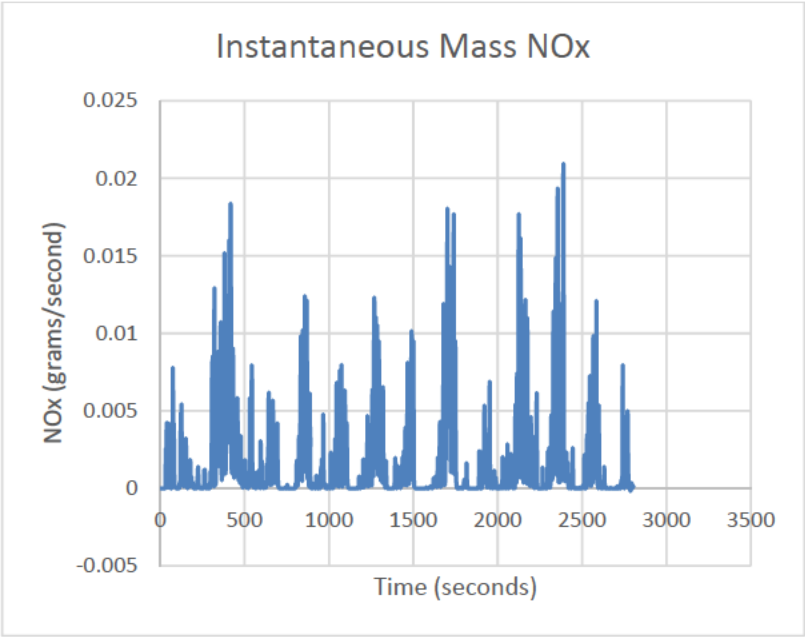


Figure 5.2.5: Vehicle 5 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

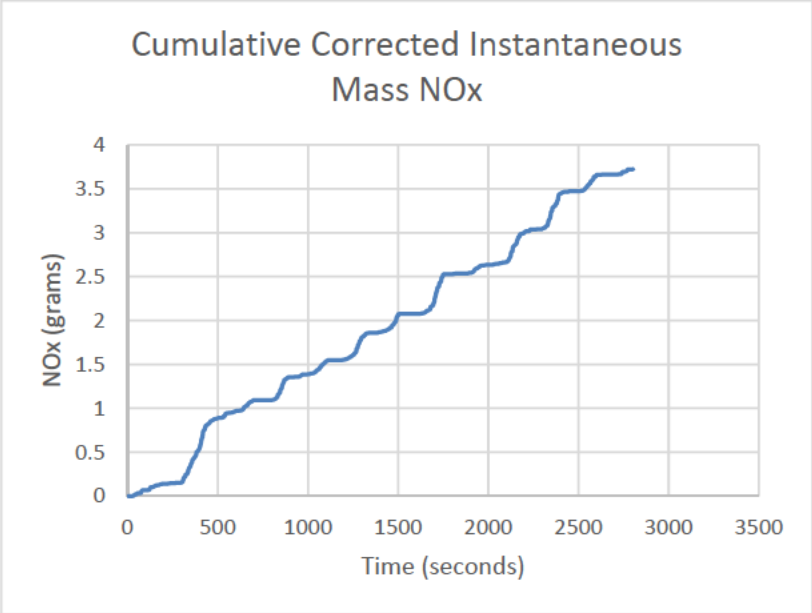


Figure 5.2.6: Vehicle 5 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

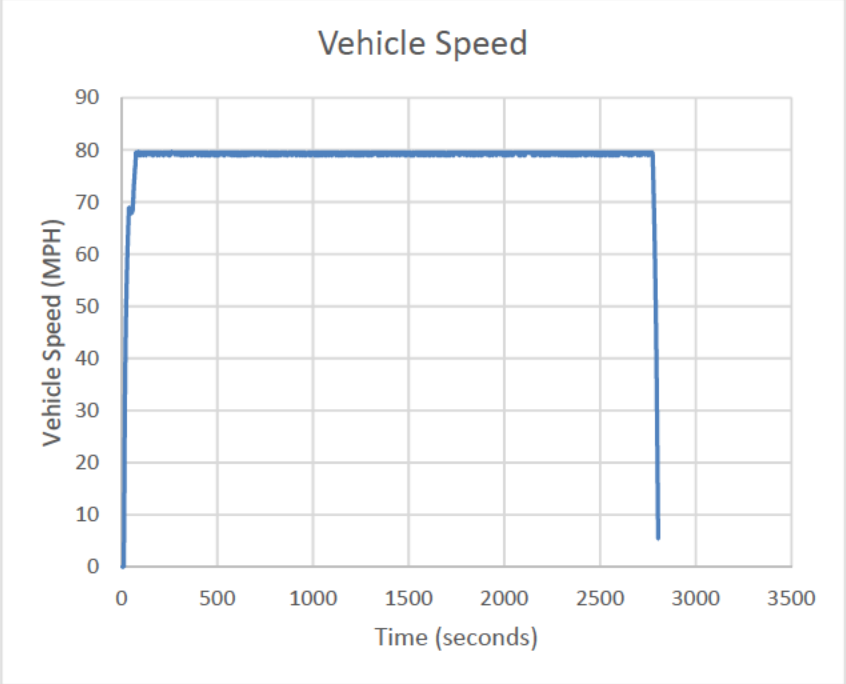


Figure 5.2.7: Vehicle 5 – 80 MPH Steady State Cruise Vehicle Speed

iii. 80 MPH Steady State Cruise PEMS Test - Repeat

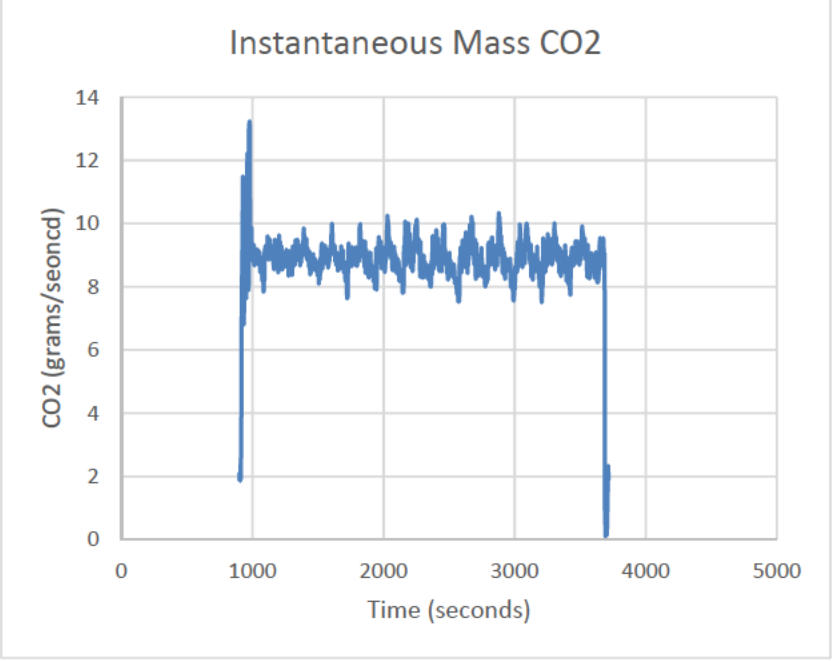


Figure 5.2.1.1: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

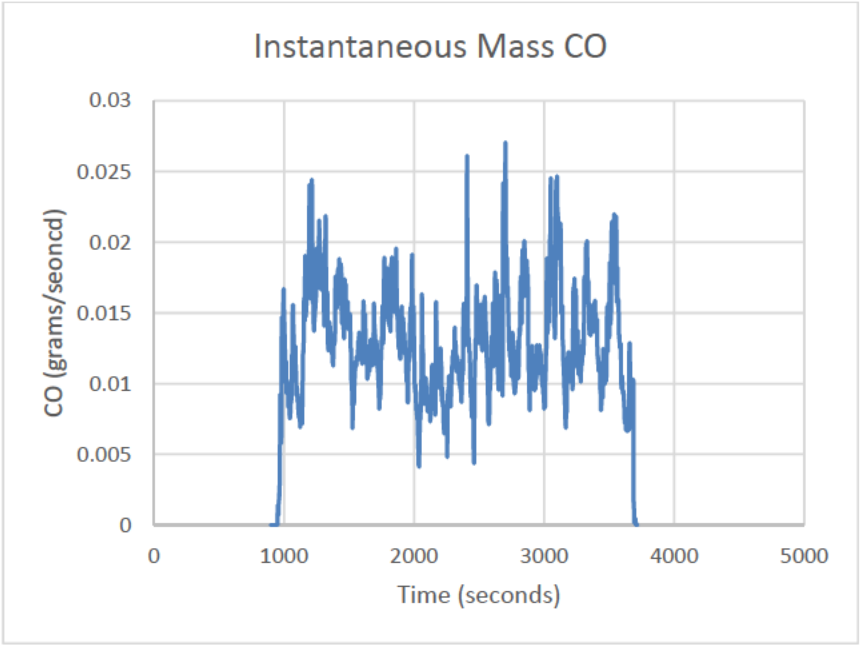


Figure 5.2.2.1: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass CO

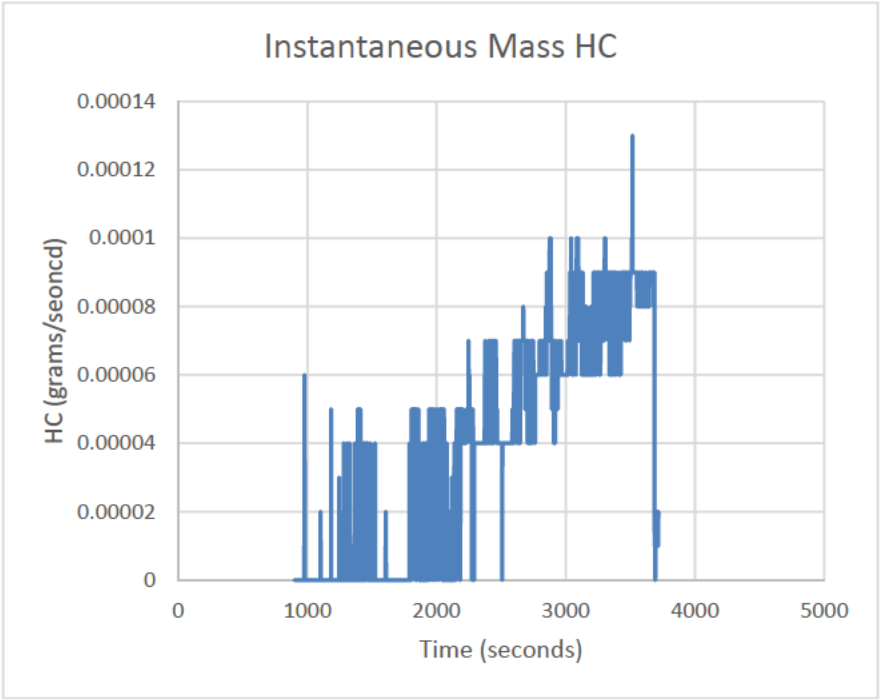


Figure 5.2.3.1: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass HC

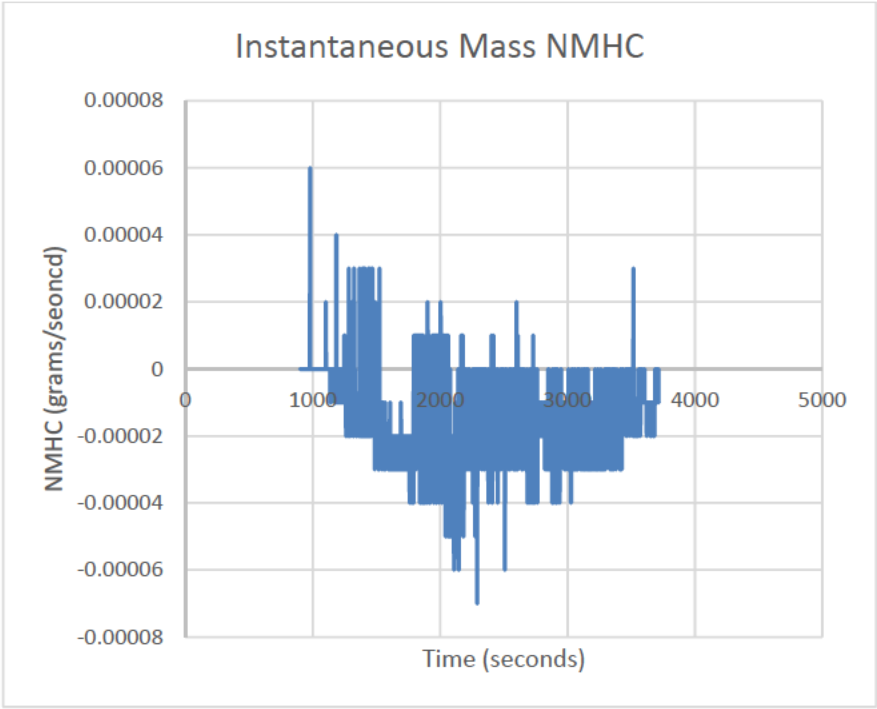


Figure 5.2.4.1: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

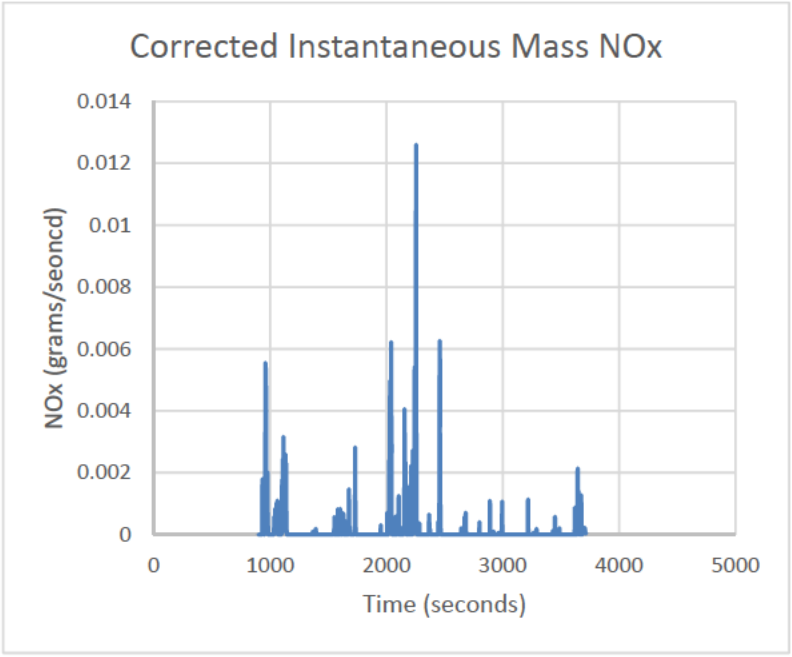


Figure 5.2.5.1: Vehicle 5 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

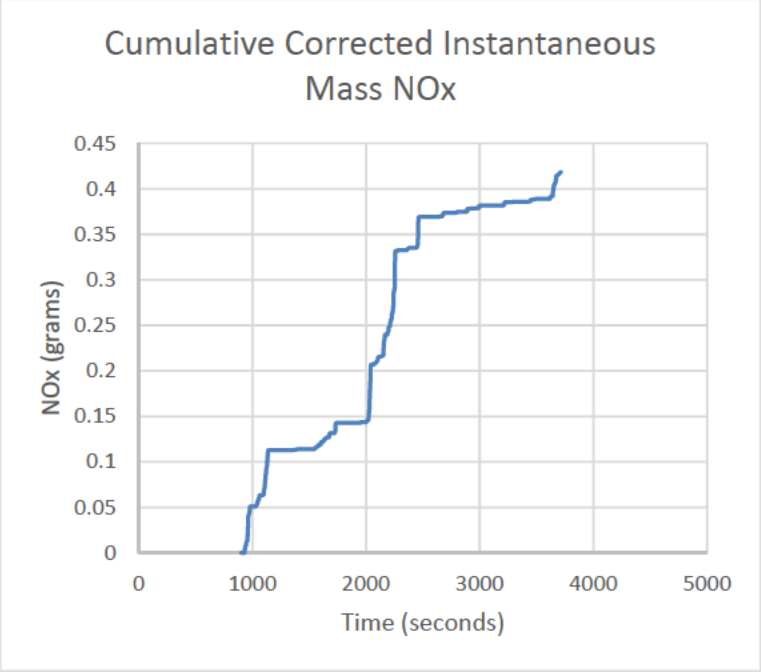


Figure 5.2.6.1: Vehicle 5 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

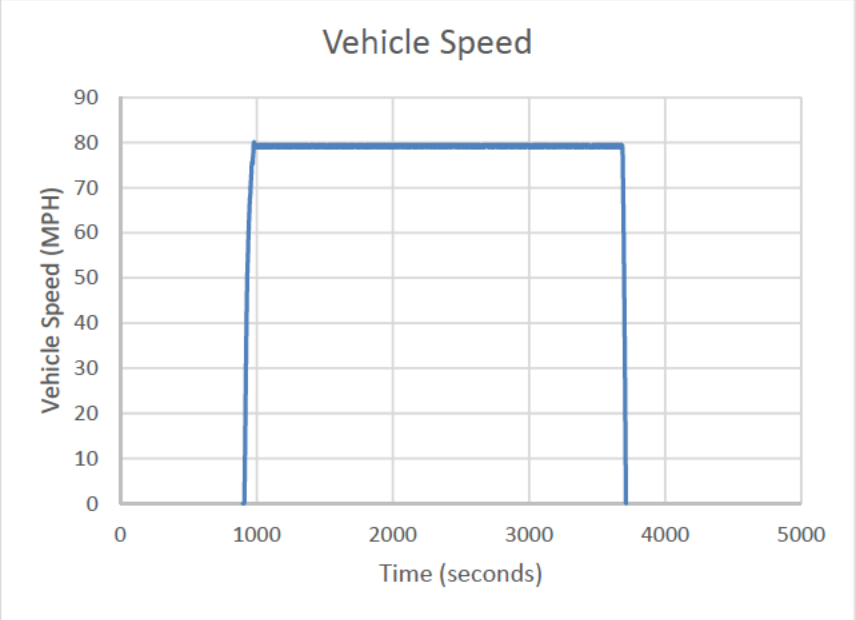


Figure 5.2.7.1: Vehicle 5 – 80 MPH Steady State Cruise Vehicle Speed

iv. Transient Cycle PEMS Test

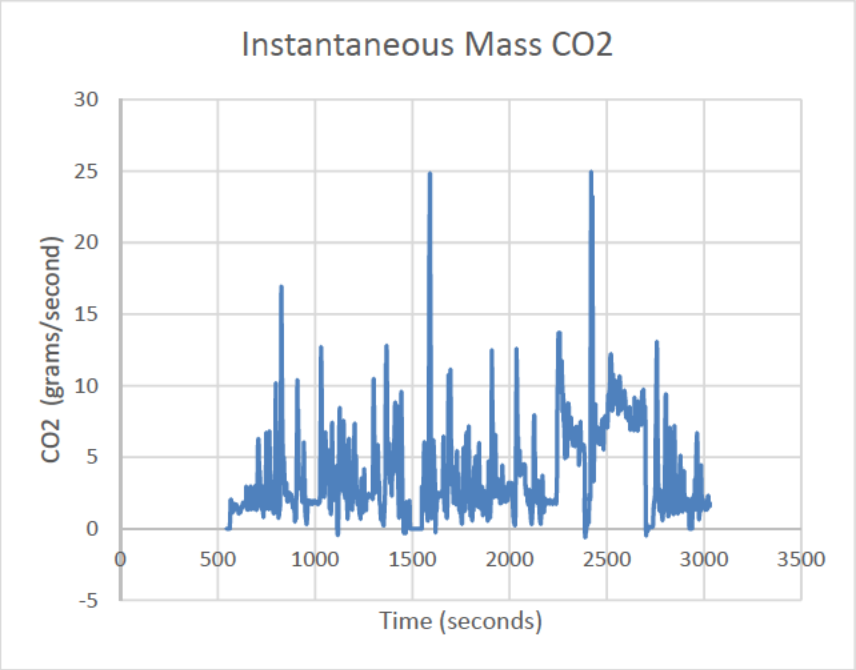


Figure 5.3.1: Vehicle 5 – Transient Cycle Instantaneous Mass CO_2

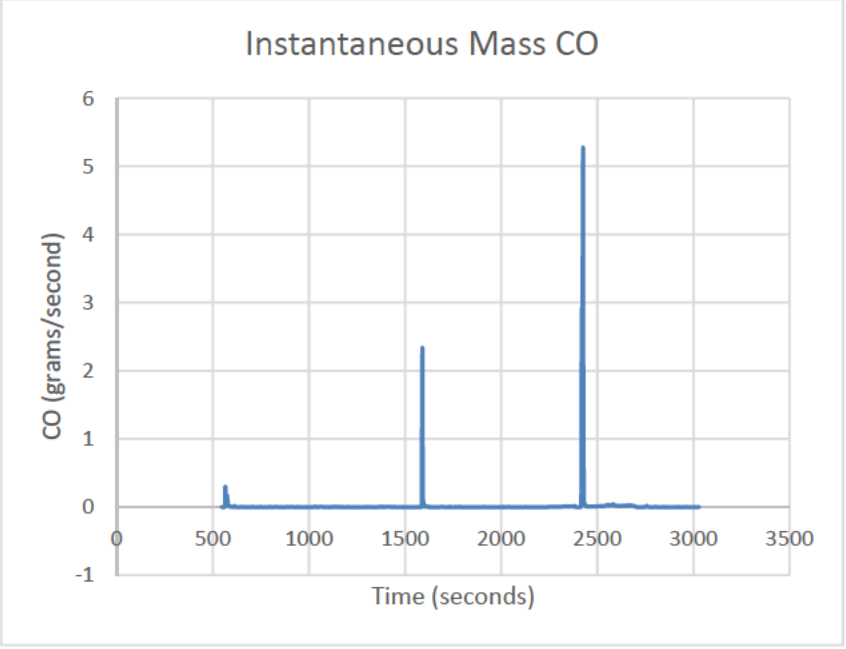


Figure 5.3.2: Vehicle 5 – Transient Cycle Instantaneous Mass CO

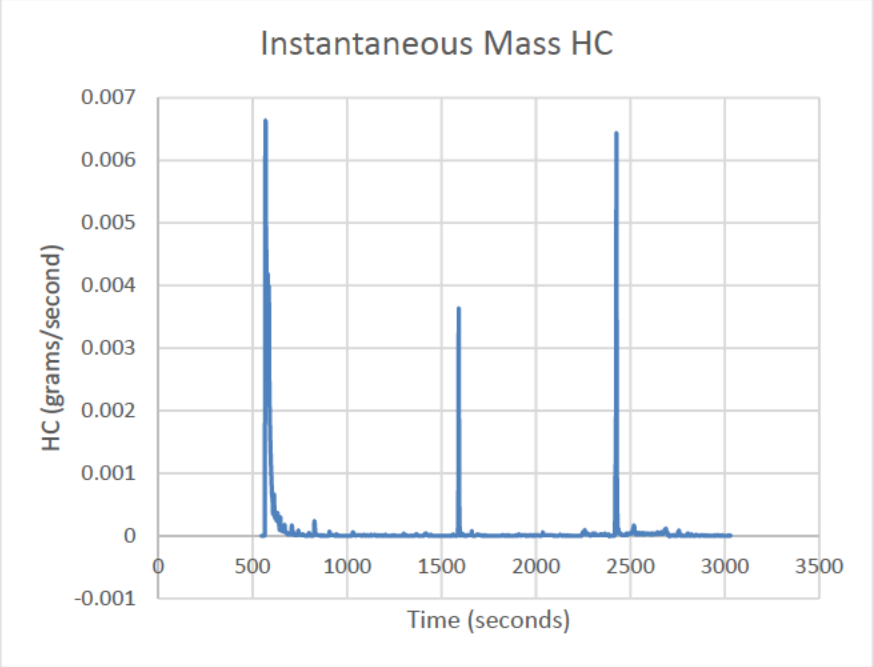


Figure 5.3.3: Vehicle 5 – Transient Cycle Instantaneous Mass HC

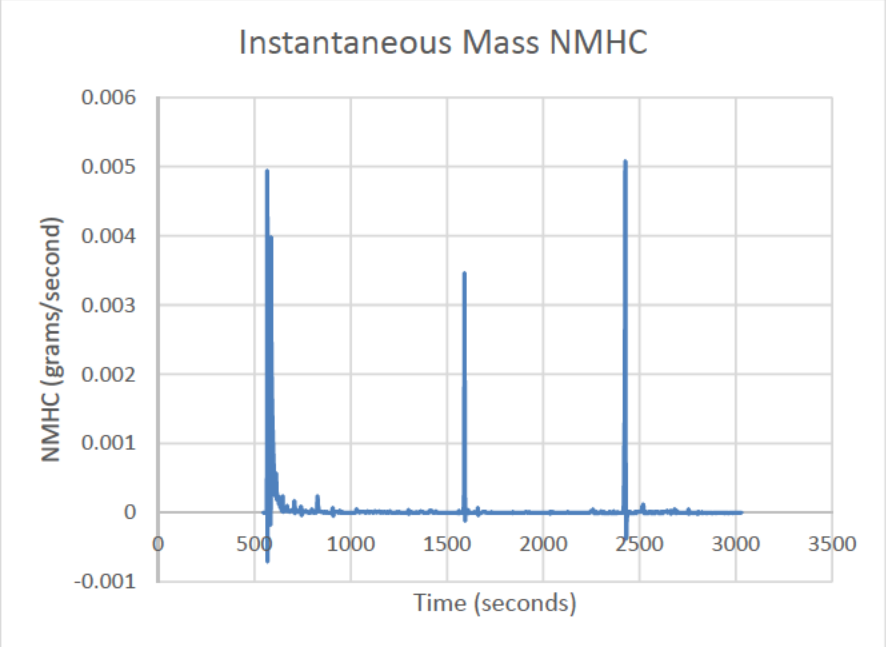


Figure 5.3.4: Vehicle 5 – Transient Cycle Instantaneous Mass NMHC

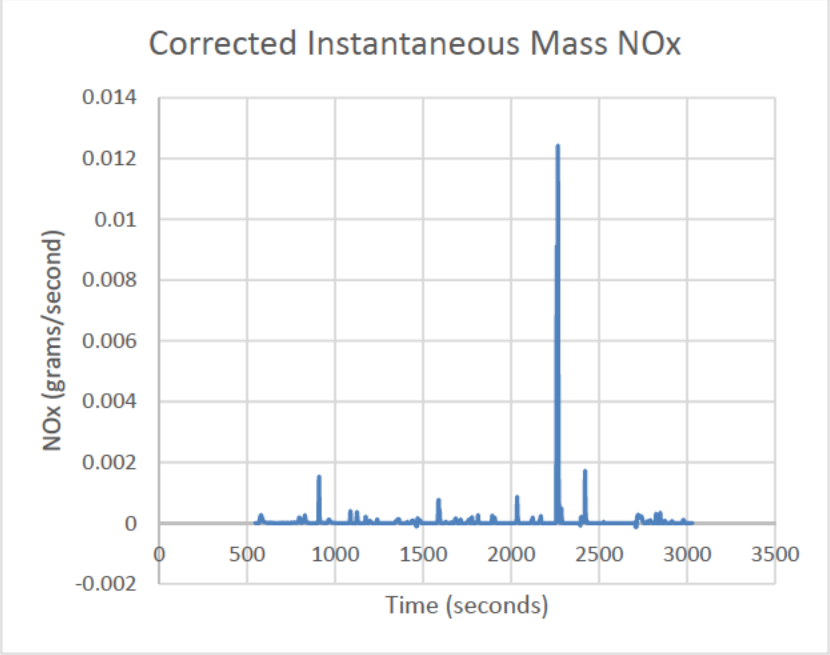


Figure 5.3.5: Vehicle 5 – Transient Cycle Instantaneous Mass NOx

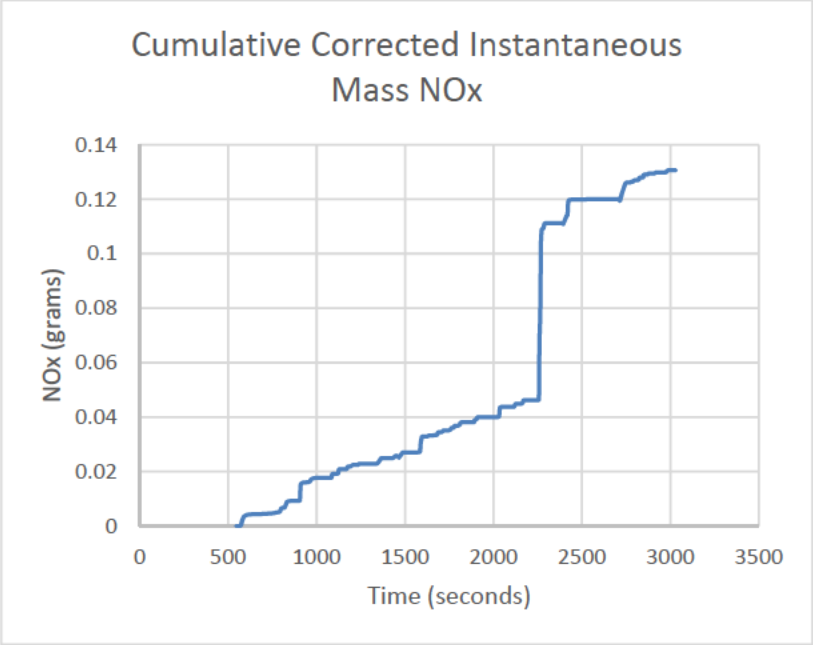


Figure 5.3.6: Vehicle 5 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

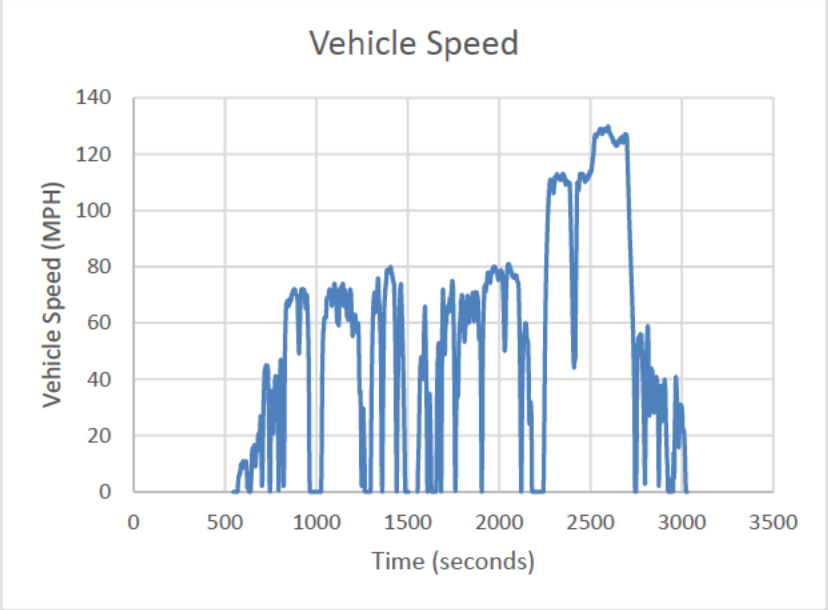


Figure 5.3.7: Vehicle 5 – Transient Cycle Vehicle Speed

6. Vehicle 6 - KCRXT03.05PV - V9DS68916
Ram 3.0L Turbo Diesel 8-speed Automatic 4WD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0082	285.3116	0.1060	0.0047	0.0245
50	0.0036	325.9130	0.1116	0.0022	0.0038
60	0.0000	386.3528	0.0718	0.0015	0.0061
65	0.0000	414.8296	0.0535	0.0014	0.0079
70	0.0000	455.5671	0.0661	0.0034	0.0120
65	0.0000	411.4963	0.0560	0.0031	0.0116
75	0.0000	489.4432	0.0665	0.0033	0.0124
80	0.0001	545.2992	0.0472	0.0015	0.0104
85	1.0514	625.0053	0.0115	0.0034	0.0155

Table 6.1: Vehicle 6 – Steady State
File: V9DS68916_SSPEMS010419112280

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0002	545.2108	0.3120	0.0037	0.0104

Table 6.2: Vehicle 6 – 80 MPH Steady State Cruise
File: V9DS68916_80SS45010319112280

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0637	500.6687	0.6705	0.0440	0.0611

Table 6.3: Vehicle 6 – Transient Cycle
File: V9DS68916_P-IUVP010219112280

b. Summary Plots

i. Steady State PEMS Test

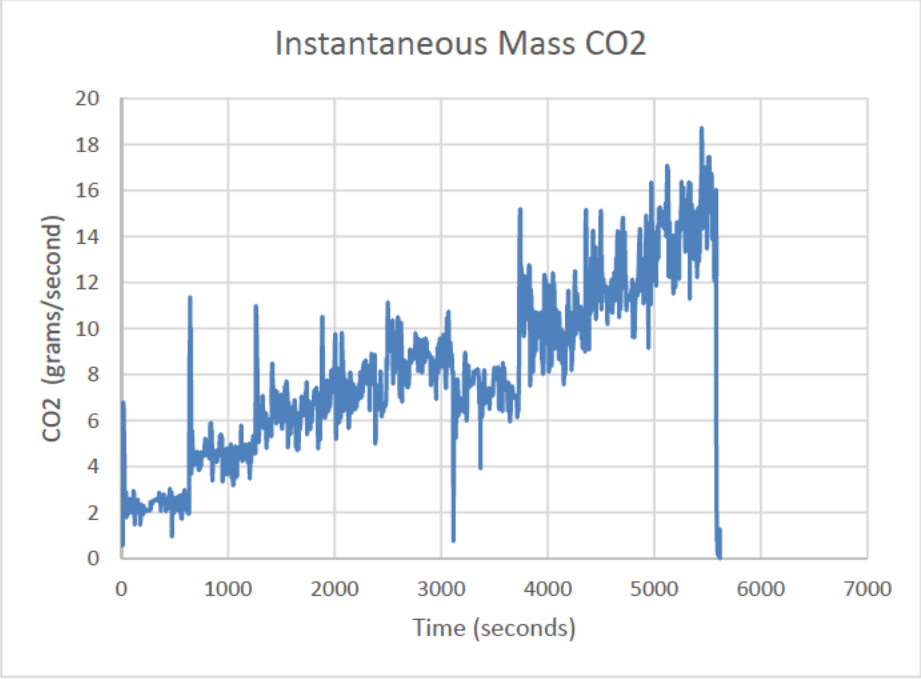


Figure 6.1.1: Vehicle 6 – Steady State Instantaneous Mass CO2

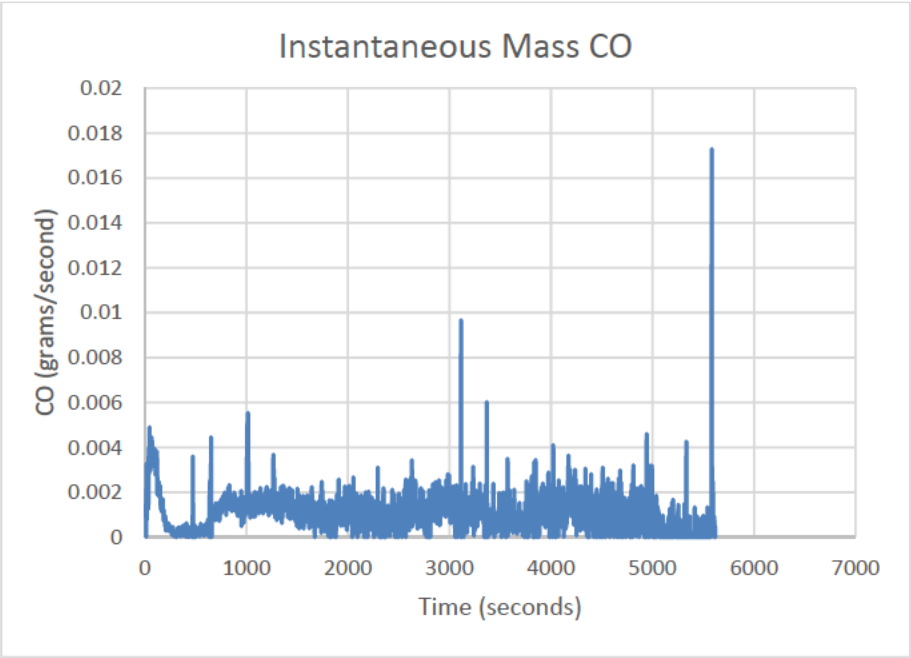


Figure 6.1.2: Vehicle 6 – Steady State Instantaneous Mass CO

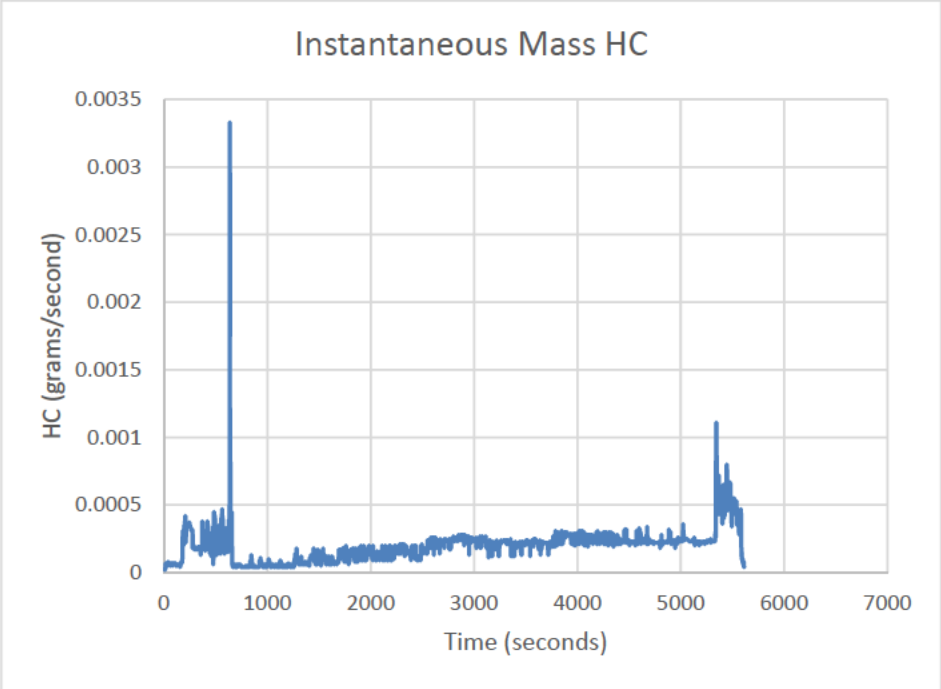


Figure 6.1.3: Vehicle 6 – Steady State Instantaneous Mass HC

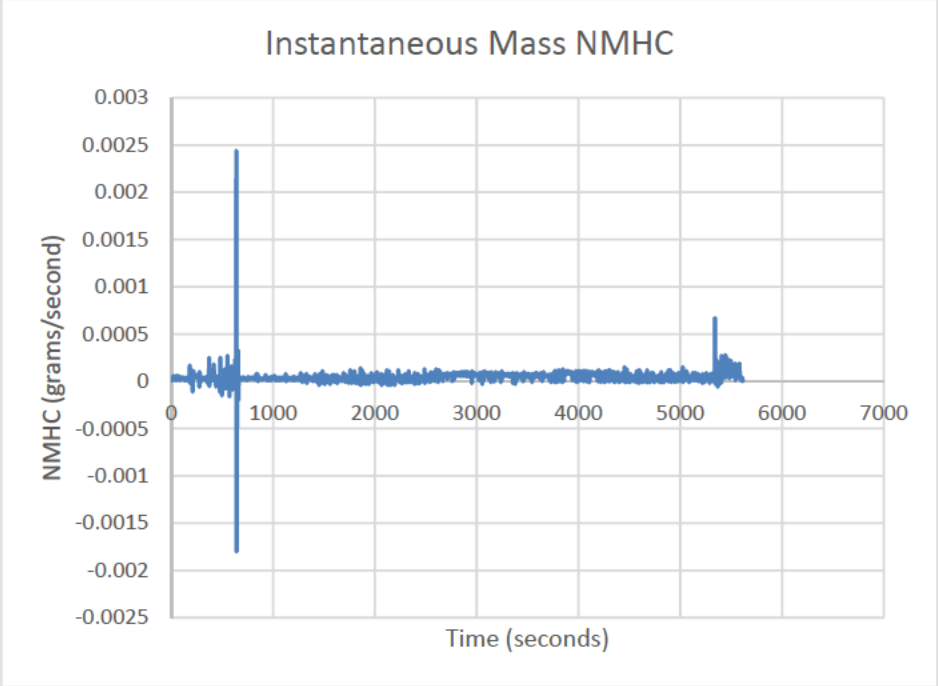


Figure 6.1.4: Vehicle 6 – Steady State Instantaneous Mass NMHC

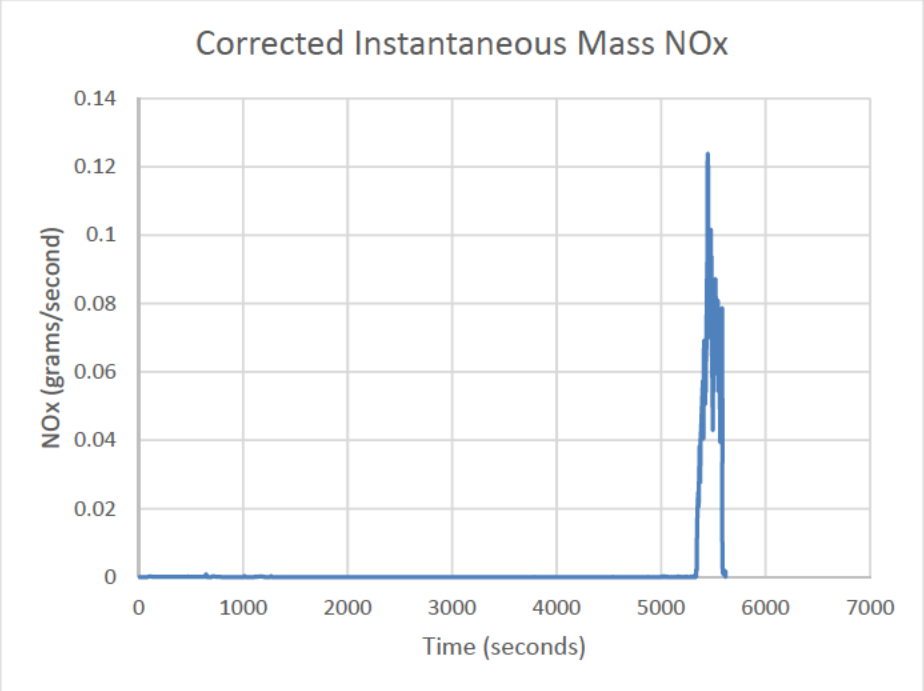


Figure 6.1.5: Vehicle 6 – Steady State Corrected Instantaneous Mass NOx

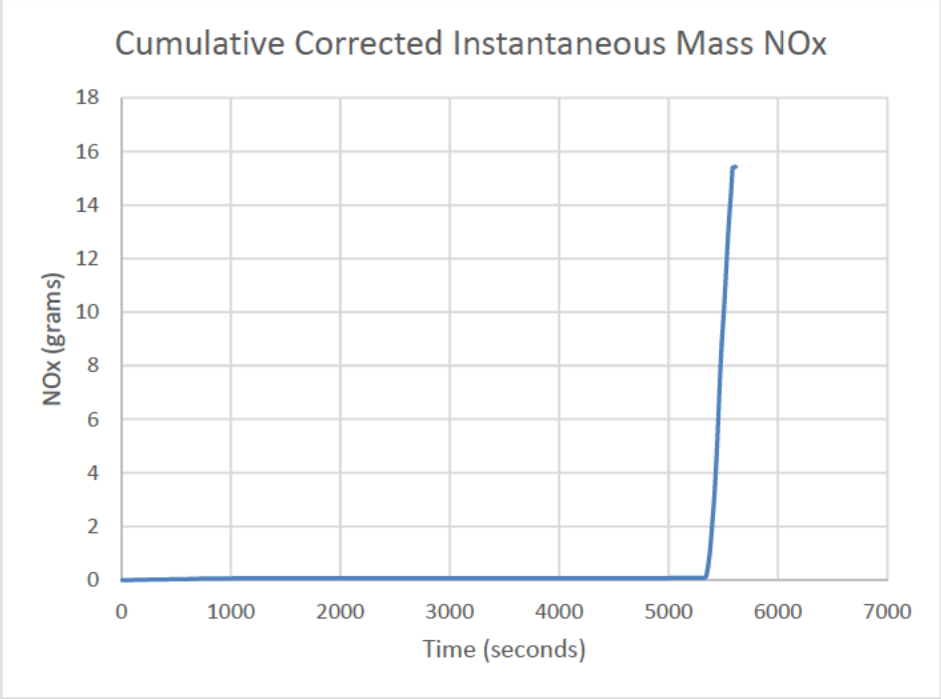


Figure 6.1.6: Vehicle 6 – Steady State Cumulative Corrected Instantaneous Mass NOx

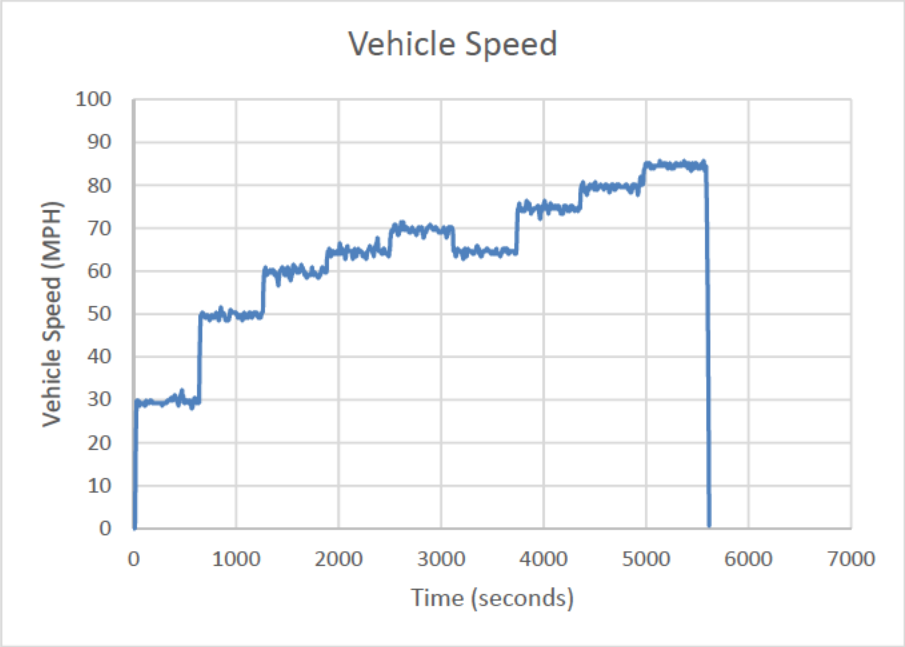


Figure 6.1.7: Vehicle 6 – Steady State Vehicle Speed

ii. 80 MPH Steady State Cruise PEMS Test

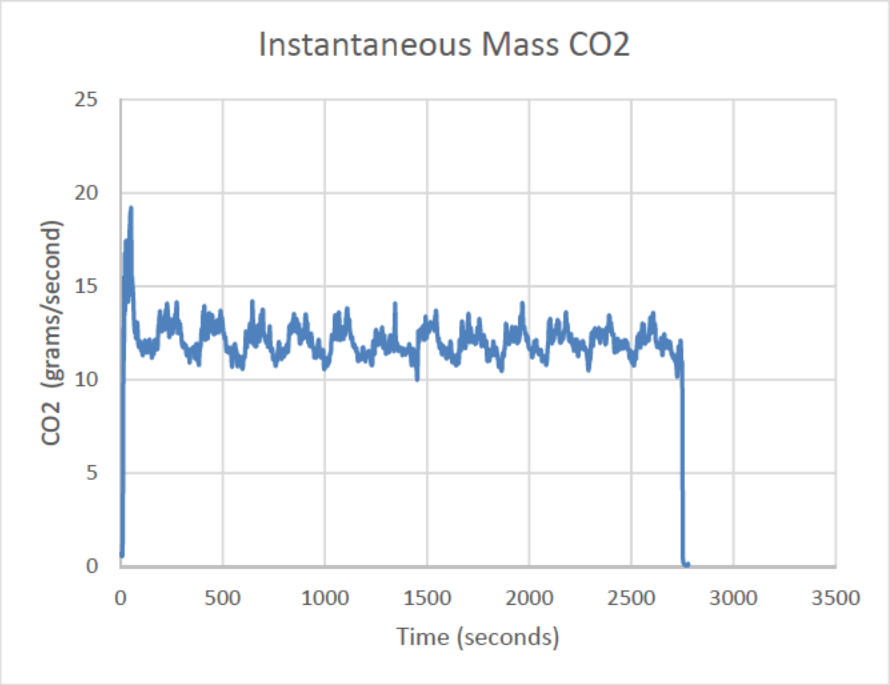


Figure 6.2.1: Vehicle 6 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

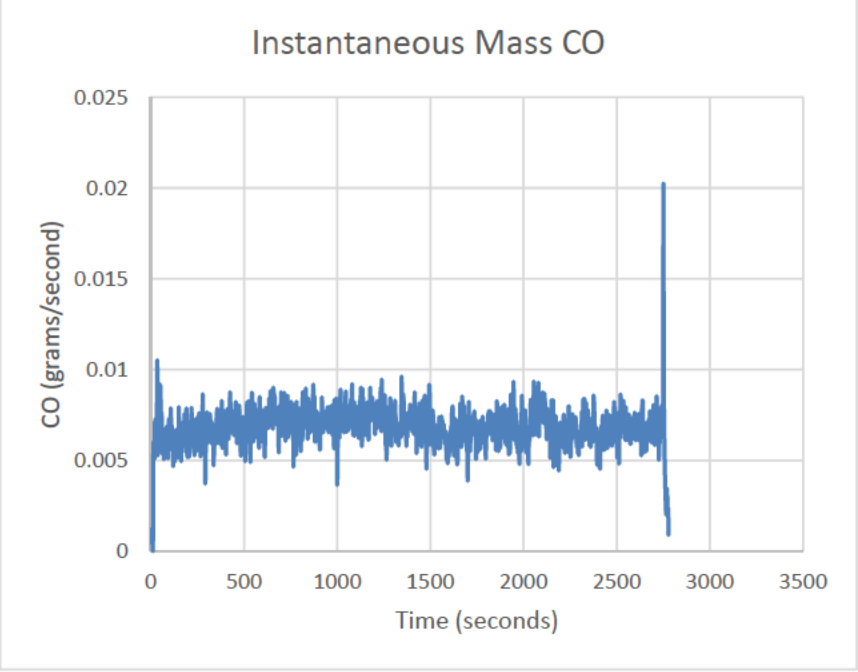


Figure 6.2.2: Vehicle 6 – 80 MPH Steady State Cruise Instantaneous Mass CO

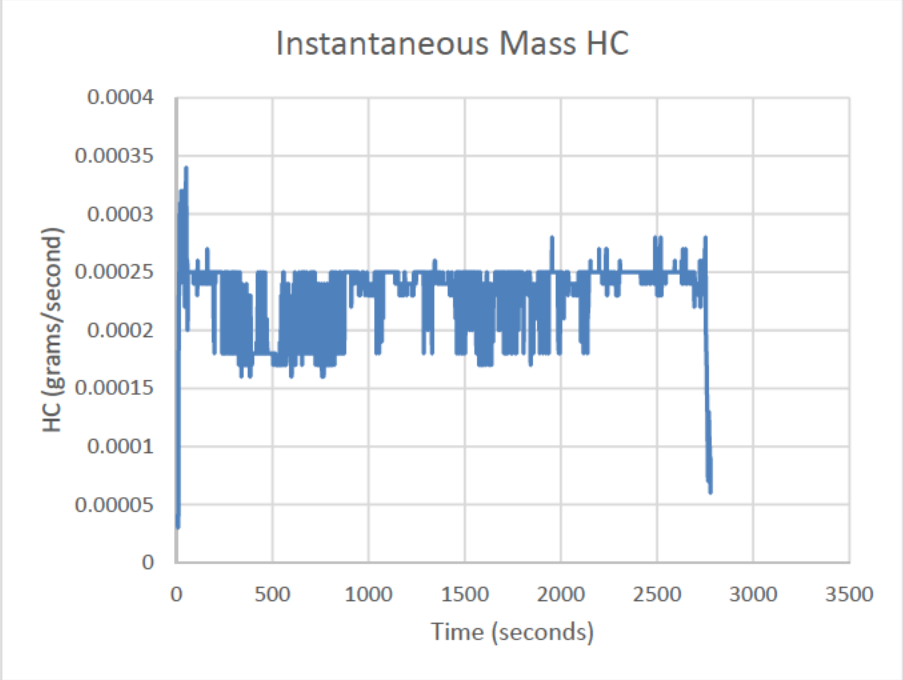


Figure 6.2.3: Vehicle 6 – 80 MPH Steady State Cruise Instantaneous Mass HC

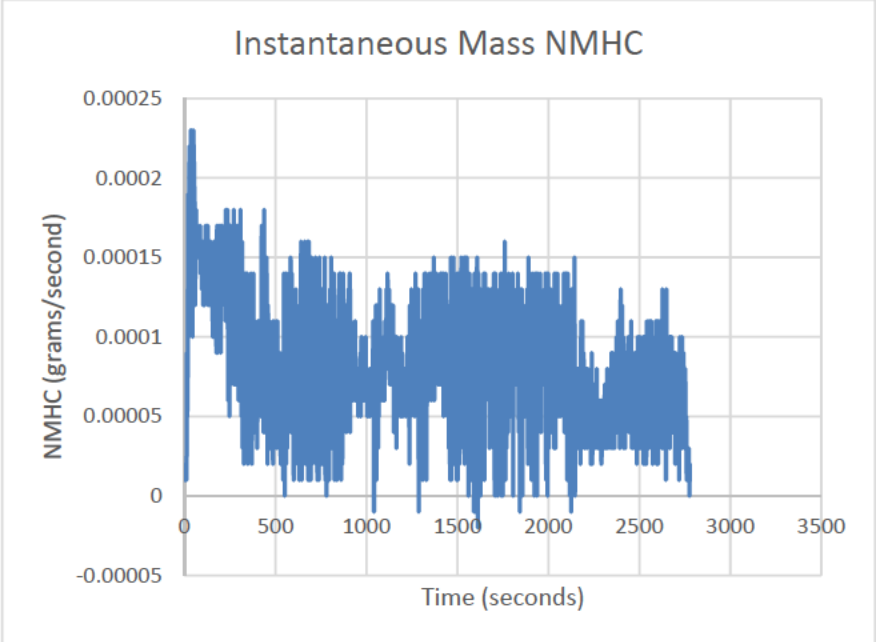


Figure 6.2.4: Vehicle 6 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

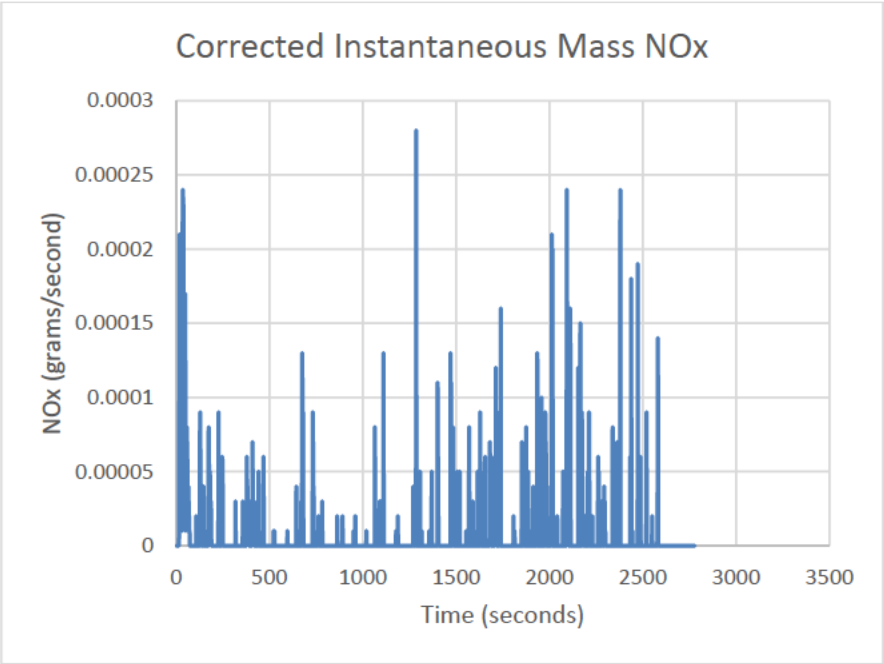


Figure 6.2.5: Vehicle 6 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

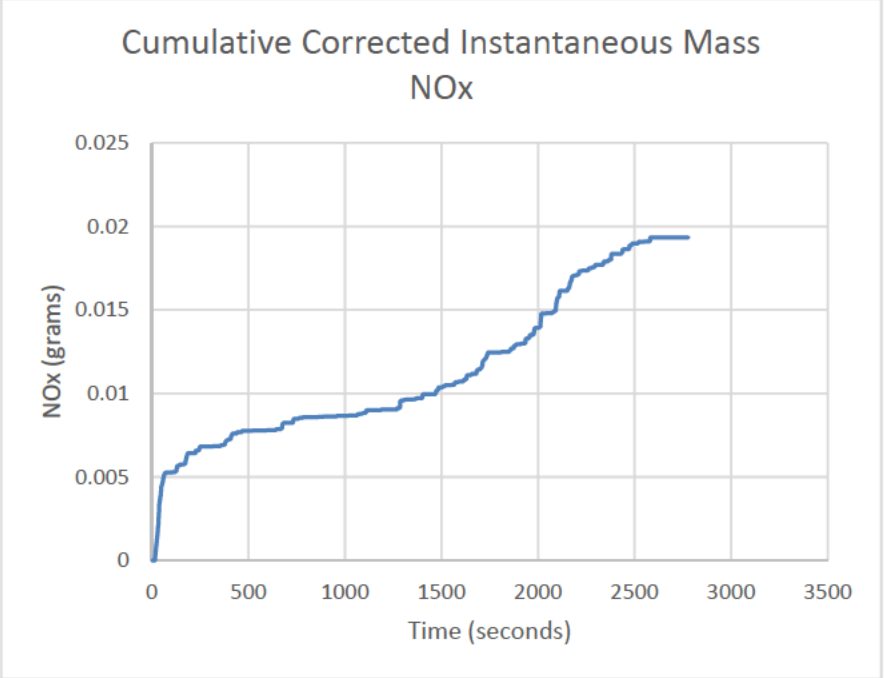


Figure 6.2.6: Vehicle 6 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

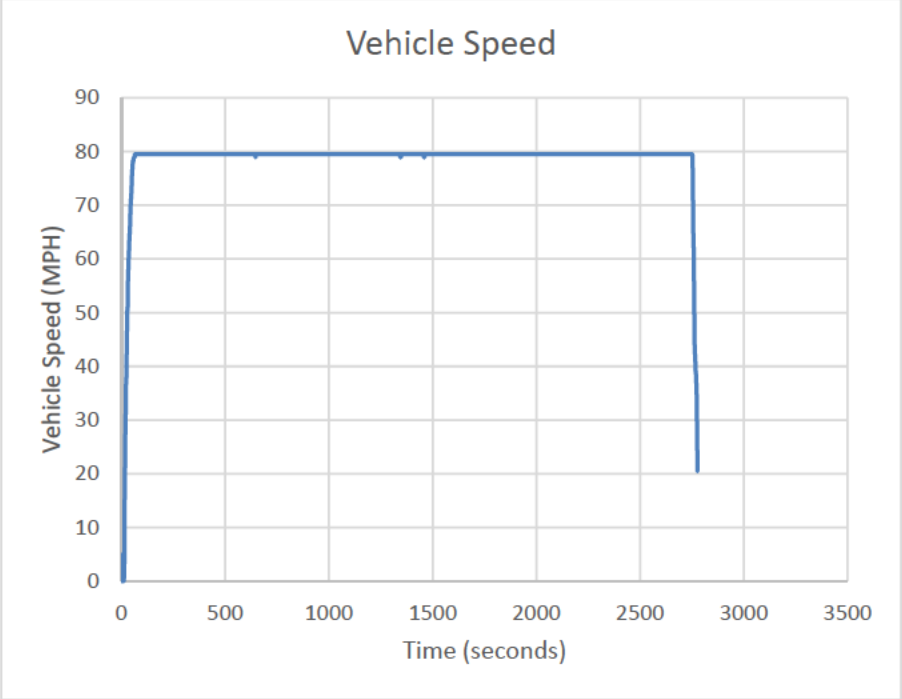


Figure 6.2.7: Vehicle 6 – 80 MPH Steady State Cruise Vehicle Speed

iii. Transient Cycle PEMS Test

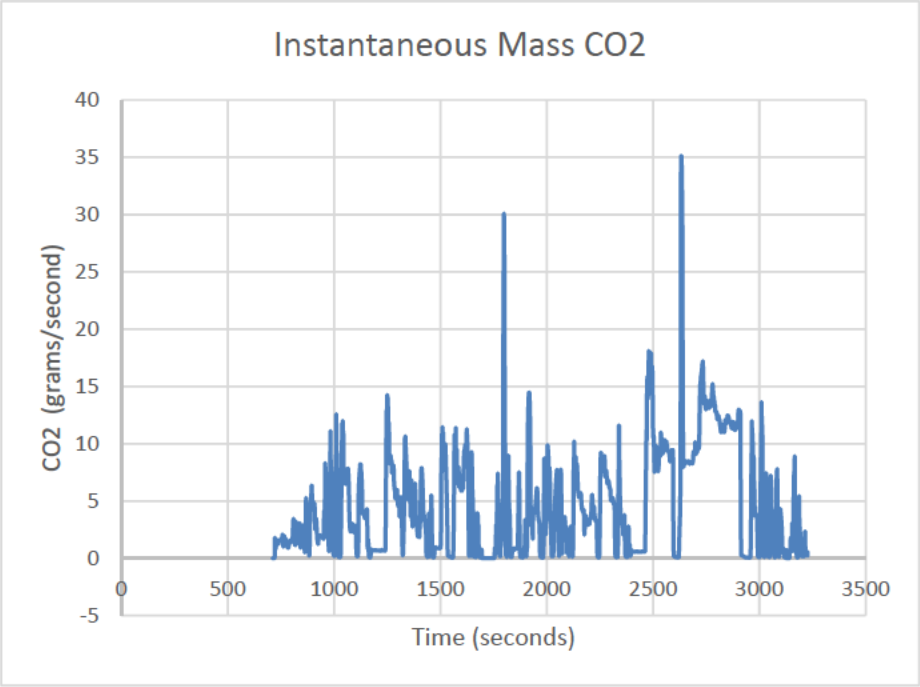


Figure 6.3.1: Vehicle 6 – Transient Cycle Instantaneous Mass CO_2

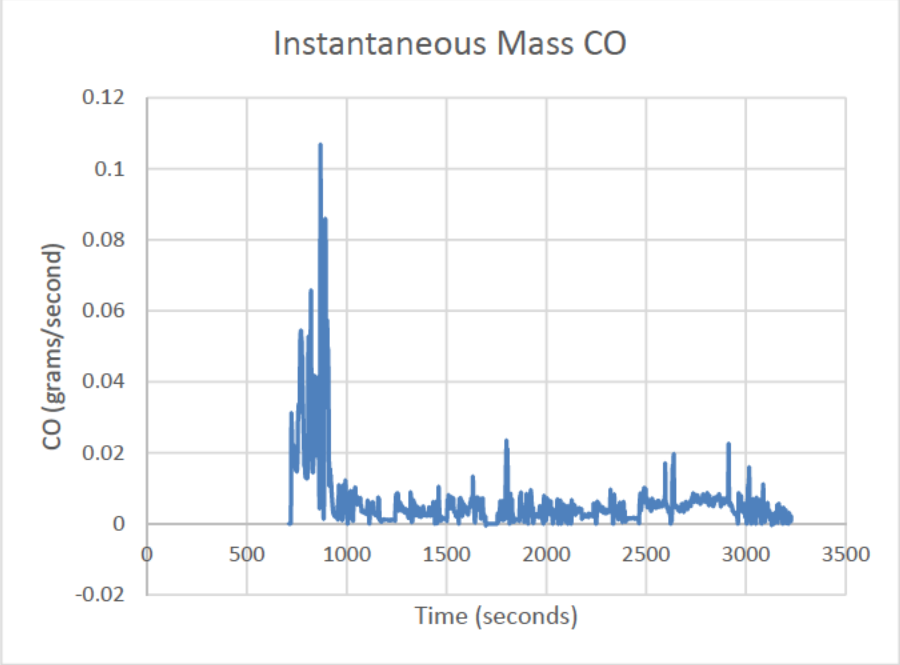


Figure 6.3.2: Vehicle 6 – Transient Cycle Instantaneous Mass CO

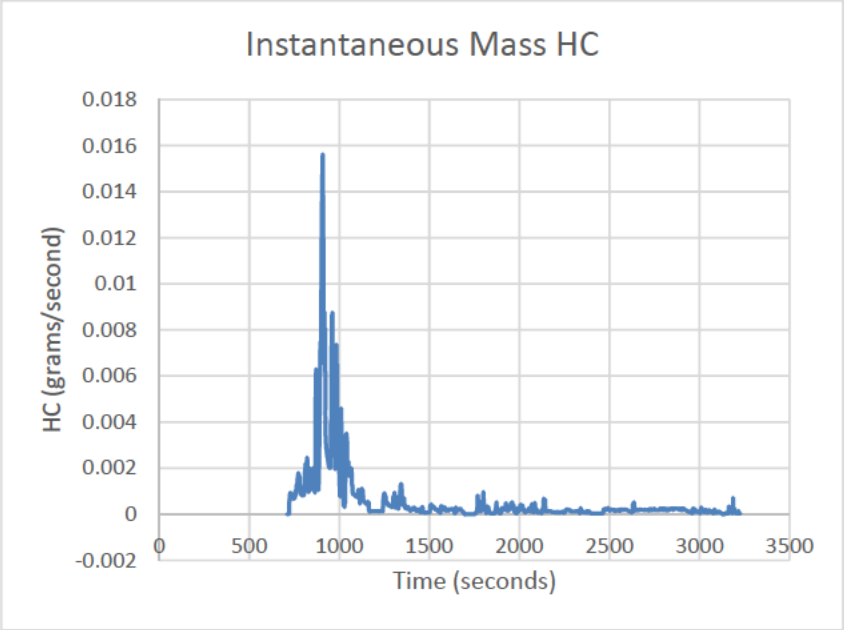


Figure 6.3.3: Vehicle 6 – Transient Cycle Instantaneous Mass HC

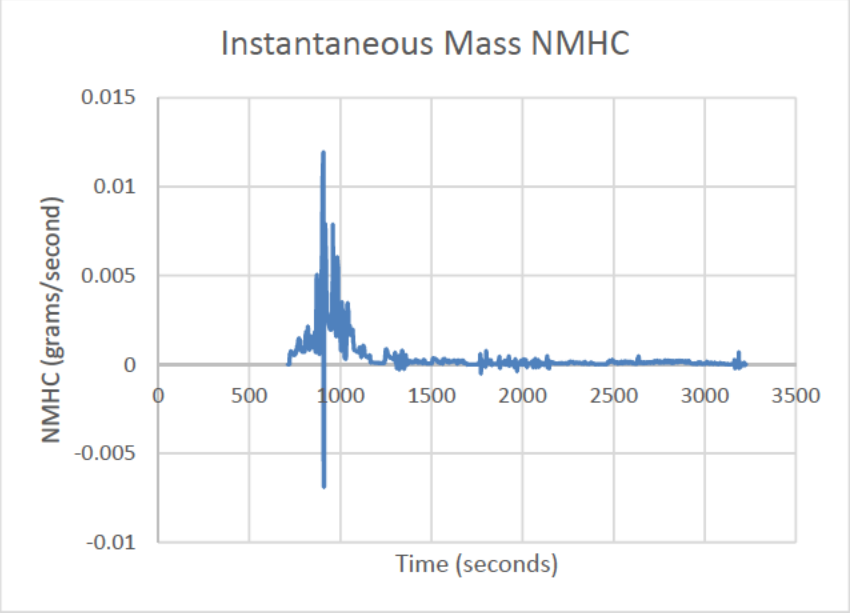


Figure 6.3.4: Vehicle 6 – Transient Cycle Instantaneous Mass NMHC

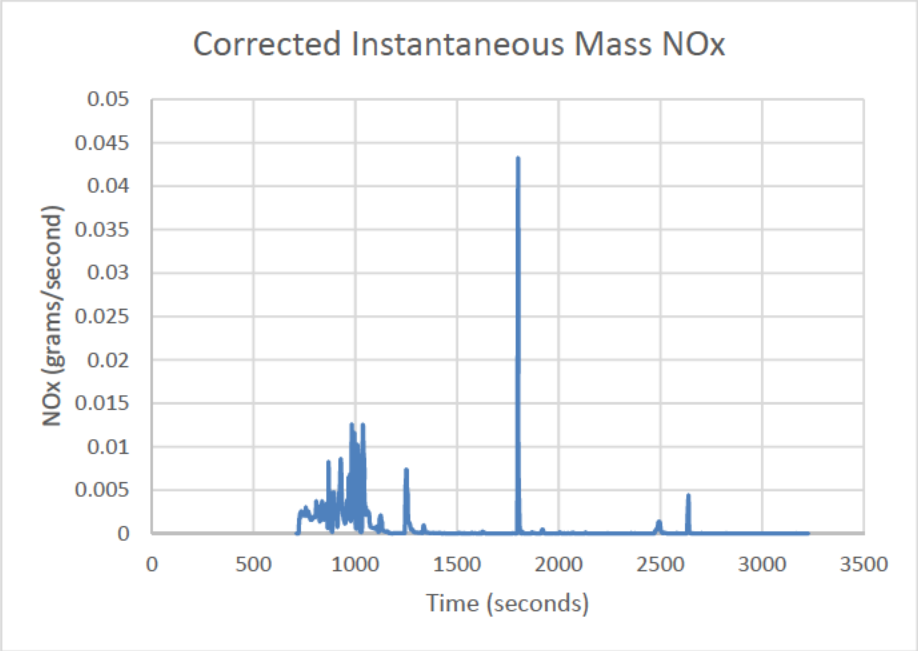


Figure 6.3.5: Vehicle 6 – Transient Cycle Instantaneous Mass NOx

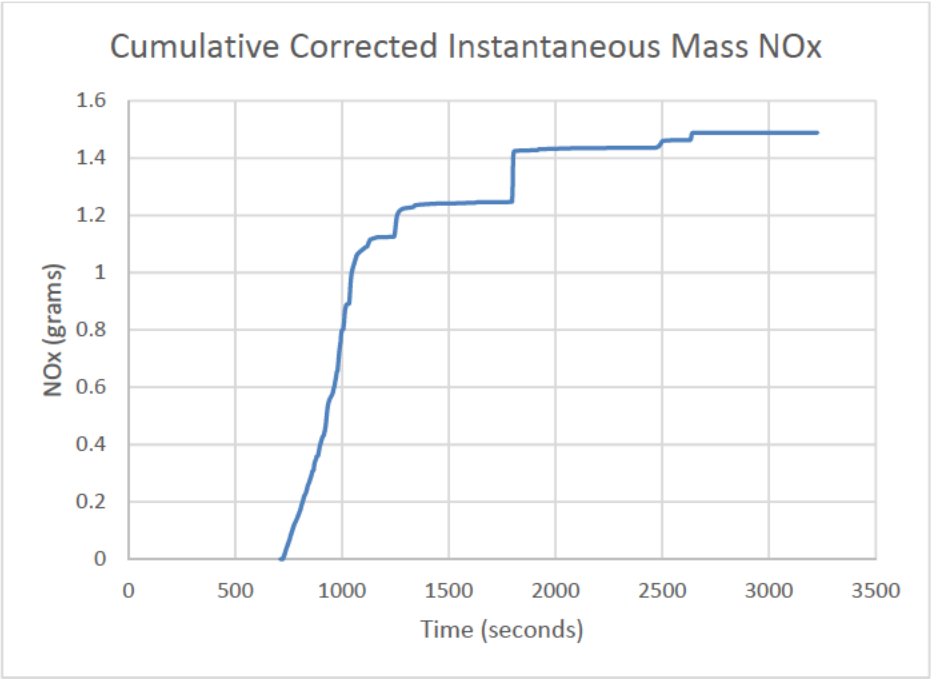


Figure 6.3.6: Vehicle 6 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

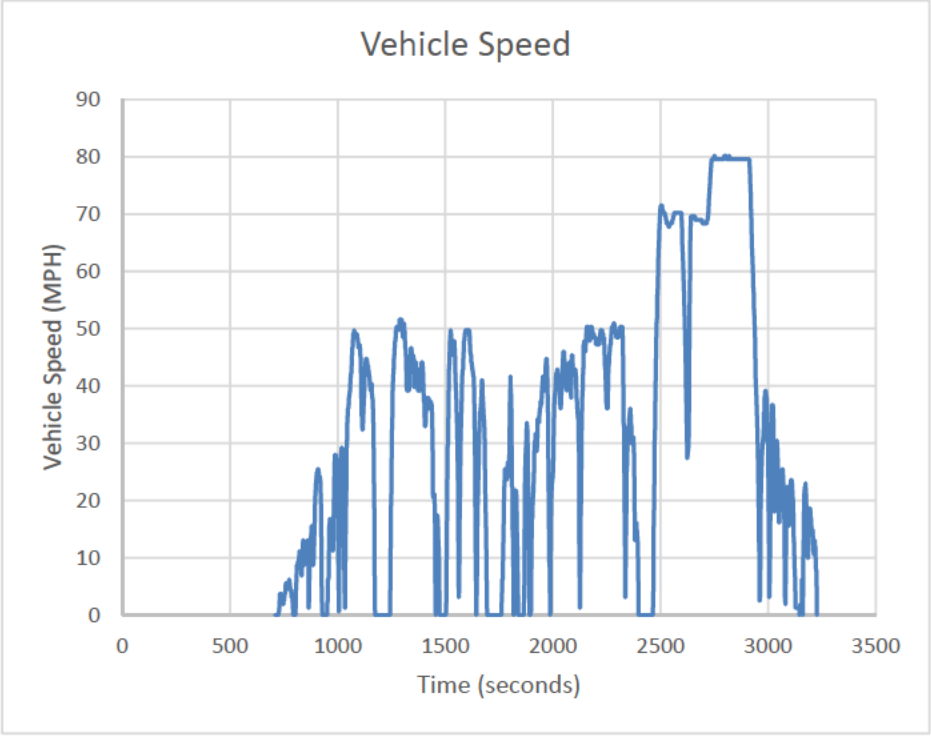


Figure 6.3.7: Vehicle 6 – Transient Cycle Vehicle Speed

7. Vehicle 7 KCRXT03.25P0 - V9KLJ7482
Jeep Cherokee 3.2L 9-speed Automatic AWD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0611	253.0589	0.0716	0.0009	0.0015
50	0.0105	264.2413	0.0916	0.0000	0.0000
60	0.1036	314.1752	0.1786	0.0028	0.0030
65	0.0159	340.1950	0.2821	0.0115	0.0136
70	0.0001	364.6315	0.4182	0.0189	0.0263
65	0.0032	336.9989	0.2843	0.0083	0.0109
75	0.0002	394.5135	0.5597	0.0109	0.0216
80	0.0002	433.6504	0.6273	0.0066	0.0171
85	0.0002	467.8838	0.7358	0.0051	0.0135
repeat 30	0.0425	271.6792	0.0000	0.0002	0.0016
repeat 60	0.0100	330.4304	0.1144	0.0022	0.0040

Table 7.1: Vehicle 7 – Steady State

File: V9KLJ7482_SSPEMS010219103080

File: V9KLJ7482_SSPEMS010119111480 – Repeat

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0055	448.2517	0.5244	0.0064	0.0167

Table 7.2: Vehicle 7 – 80 MPH Steady State Cruise

File: V9KLJ7482_80SS45010319103080

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0137	452.6331	3.8194	0.0175	0.0301

Table 7.3: Vehicle 7 – Transient Cycle

File: V9KLJ7482_P-IUVP010119103080

b. Summary Plots

i. Steady State PEMS Test

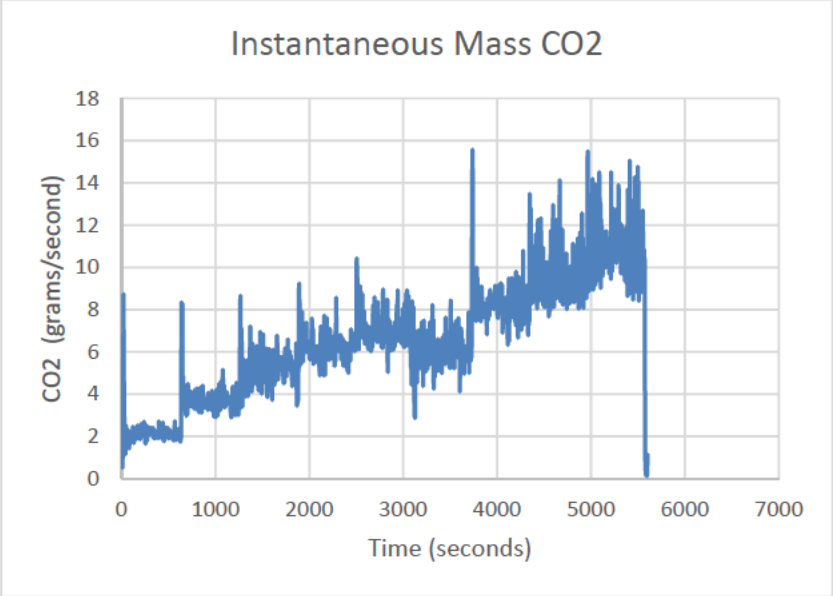


Figure 7.1.1: Vehicle 7 – Steady State Instantaneous Mass CO_2

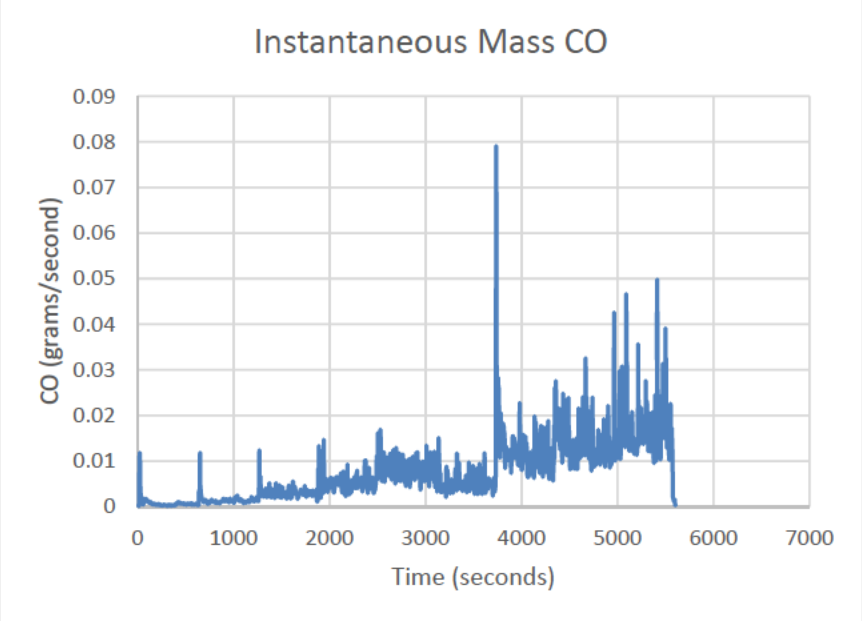


Figure 7.1.2: Vehicle 7 – Steady State Instantaneous Mass CO

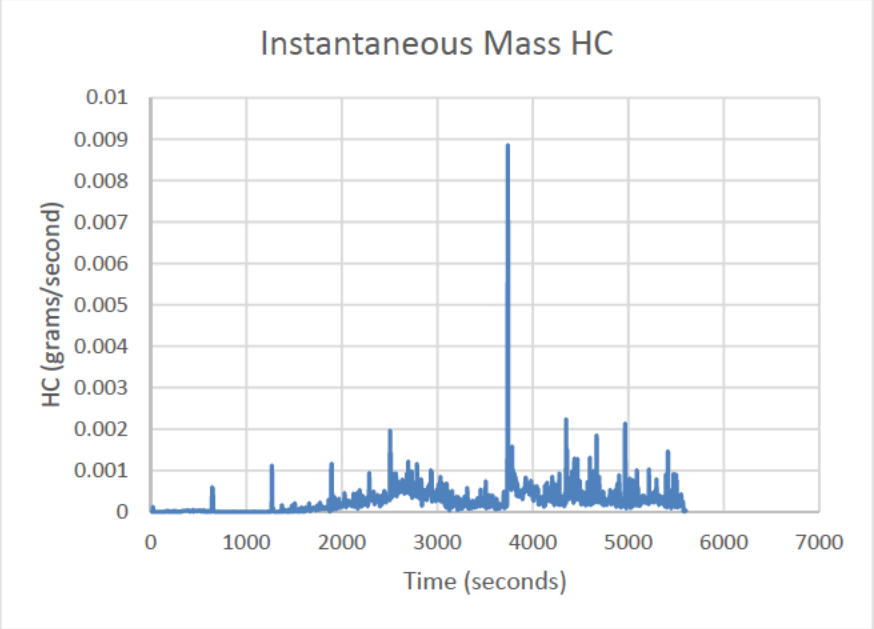


Figure 7.1.3: Vehicle 7 – Steady State Instantaneous Mass HC

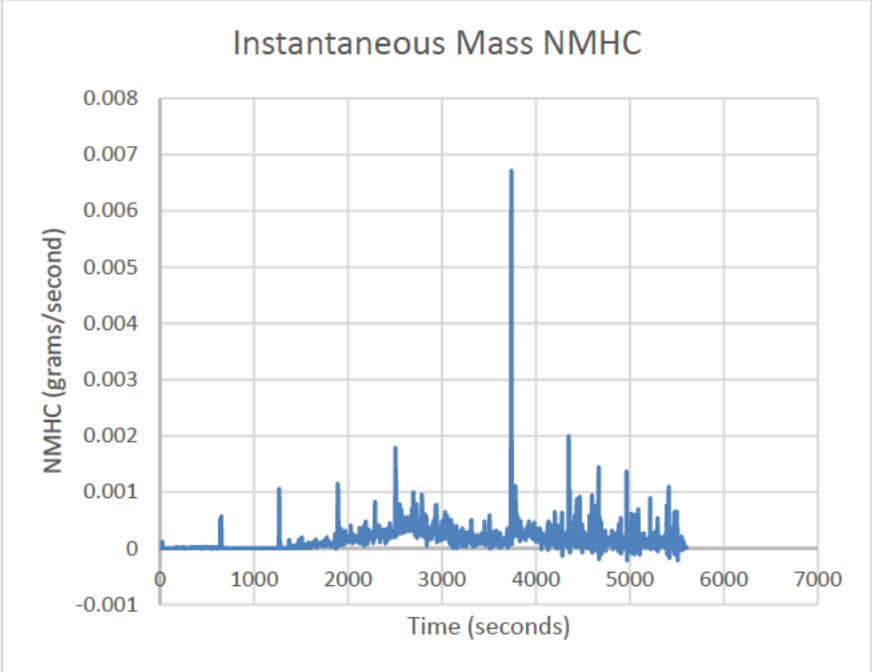


Figure 7.1.4: Vehicle 7 – Steady State Instantaneous Mass NMHC

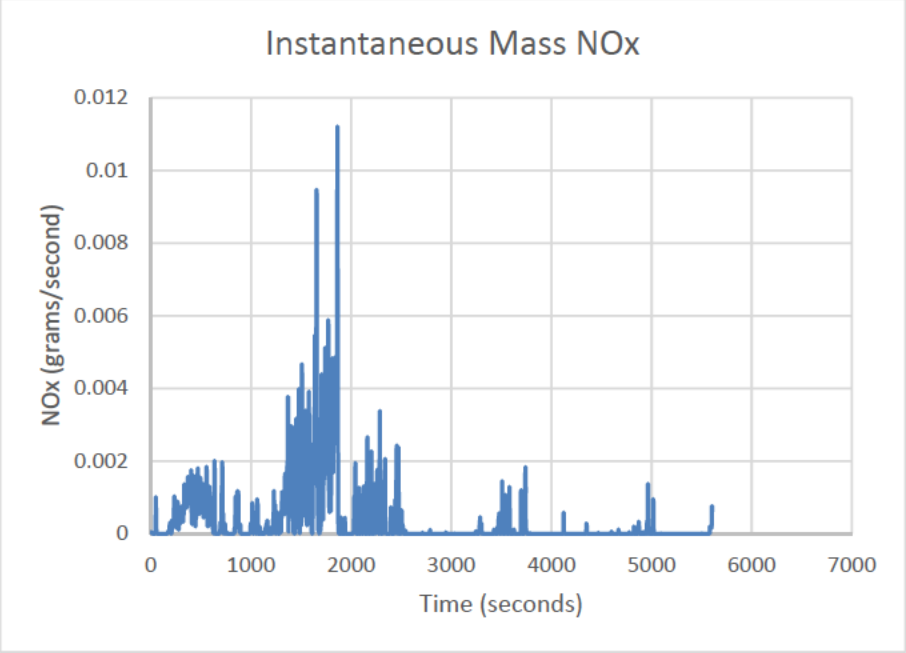


Figure 7.1.5: Vehicle 7 – Steady State Corrected Instantaneous Mass NOx

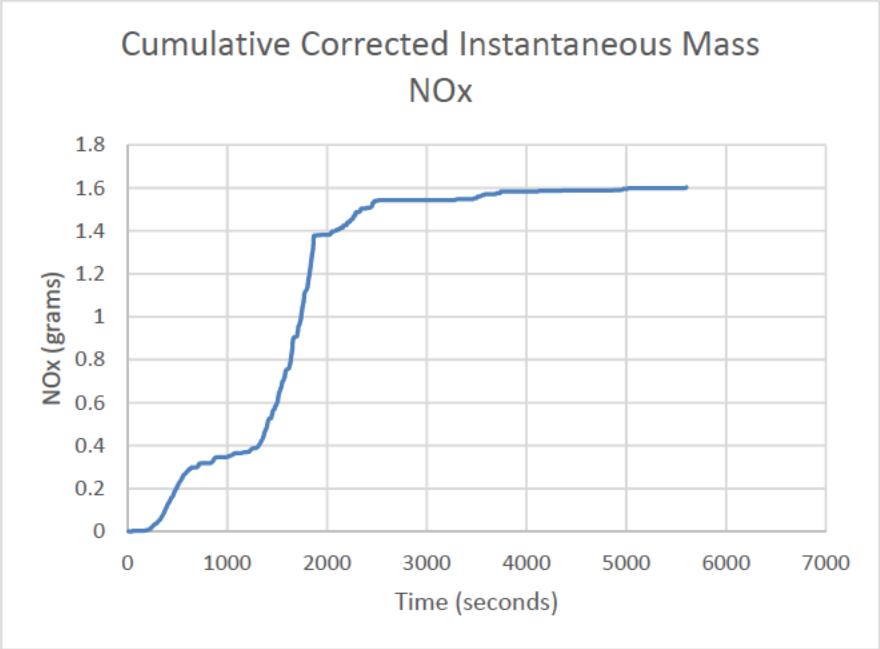


Figure 7.1.6: Vehicle 7 – Steady State Cumulative Corrected Instantaneous Mass NOx

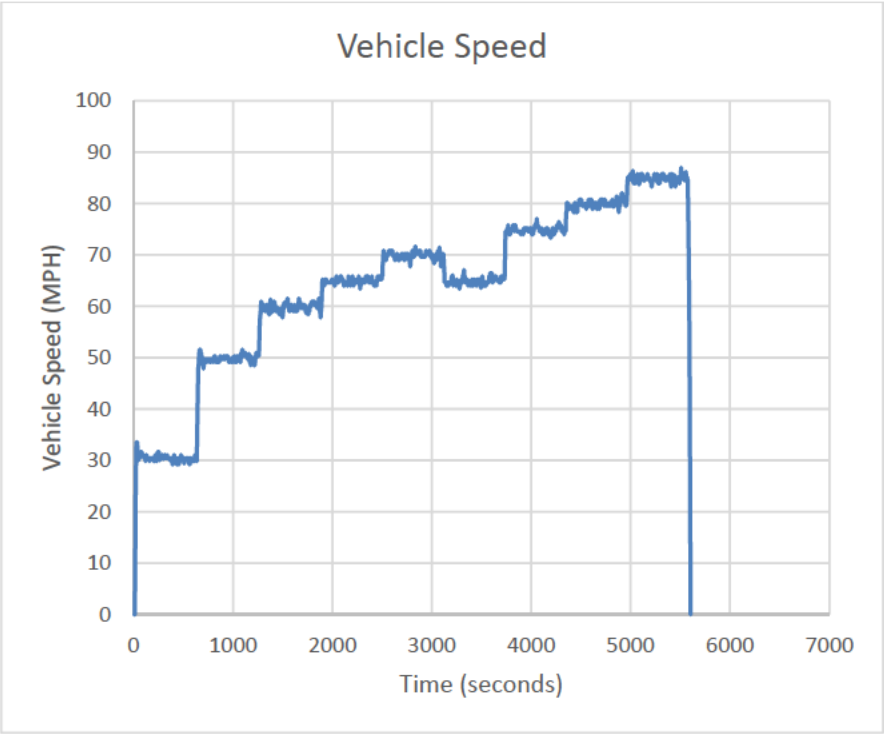


Figure 7.1.7: Vehicle 7 – Steady State Vehicle Speed

ii. Steady State PEMS Test – Repeat

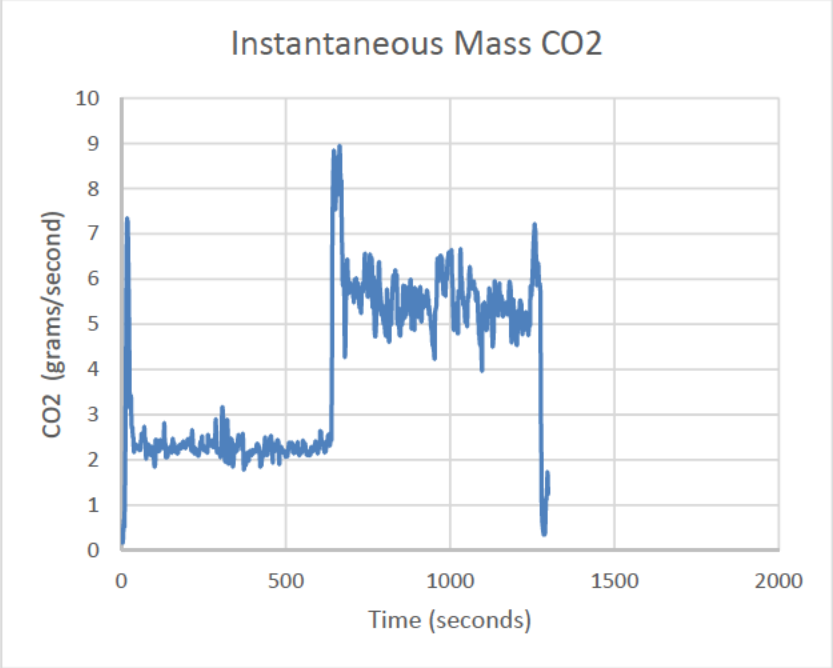


Figure 7.1.1.1: Vehicle 7 – Steady State Instantaneous Mass CO_2

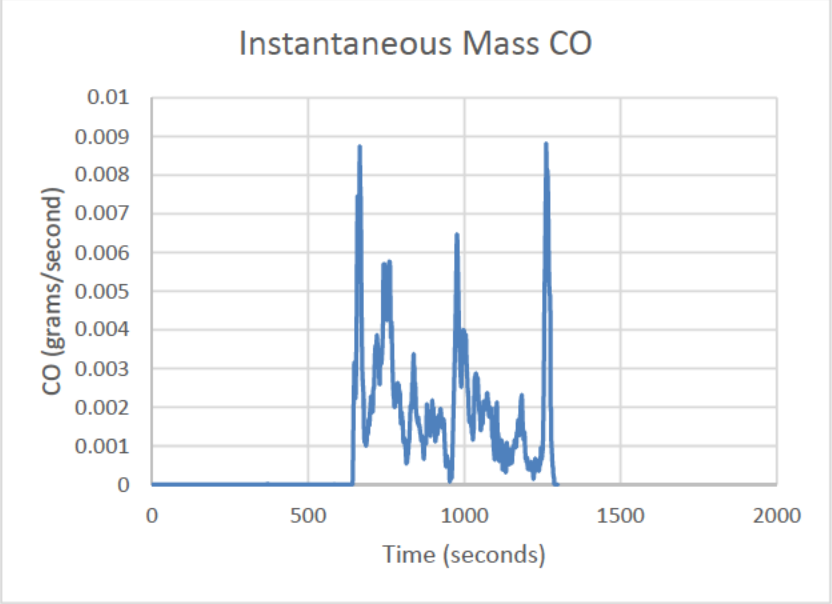


Figure 7.1.2.1: Vehicle 7 – Steady State Instantaneous Mass CO

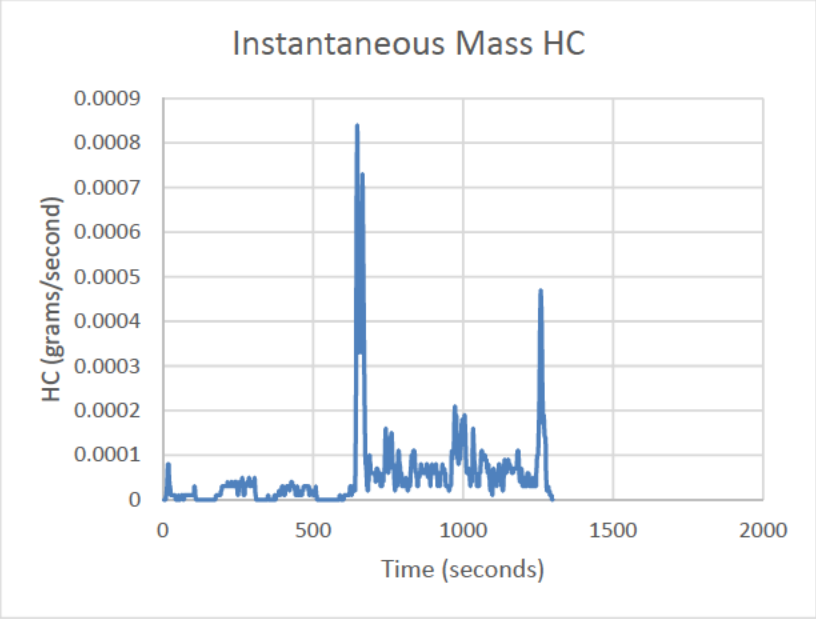


Figure 7.1.3.1: Vehicle 7 – Steady State Instantaneous Mass HC

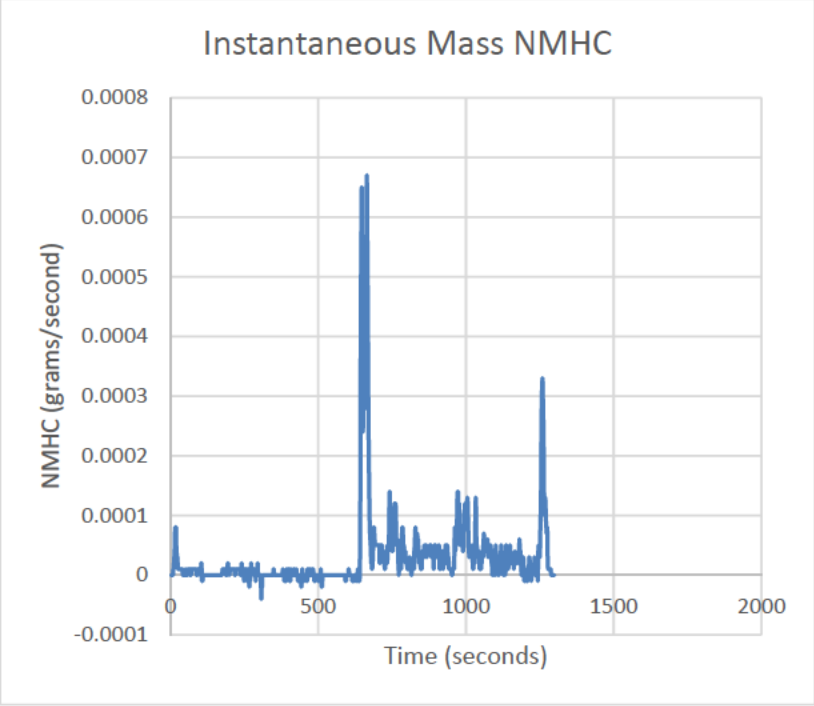


Figure 7.1.4.1: Vehicle 7 – Steady State Instantaneous Mass NMHC

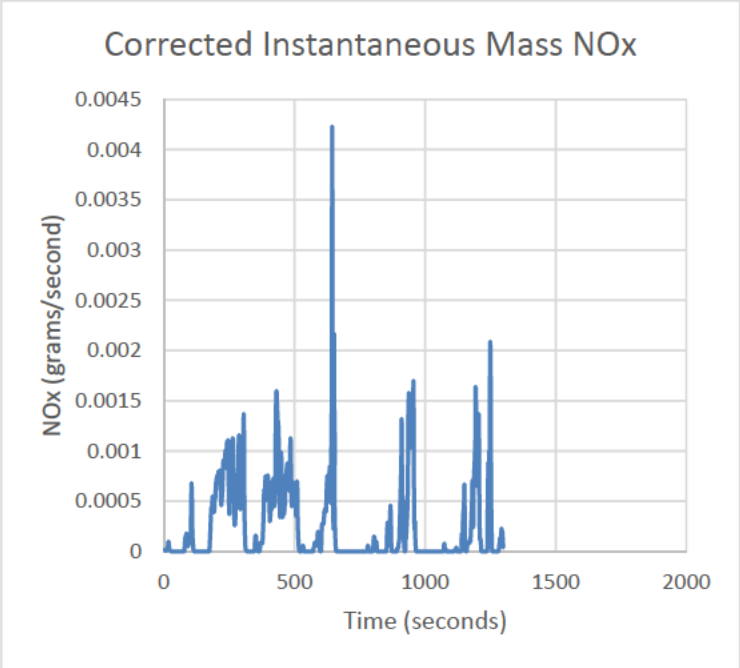


Figure 7.1.5.1: Vehicle 7 – Steady State Corrected Instantaneous Mass NOx

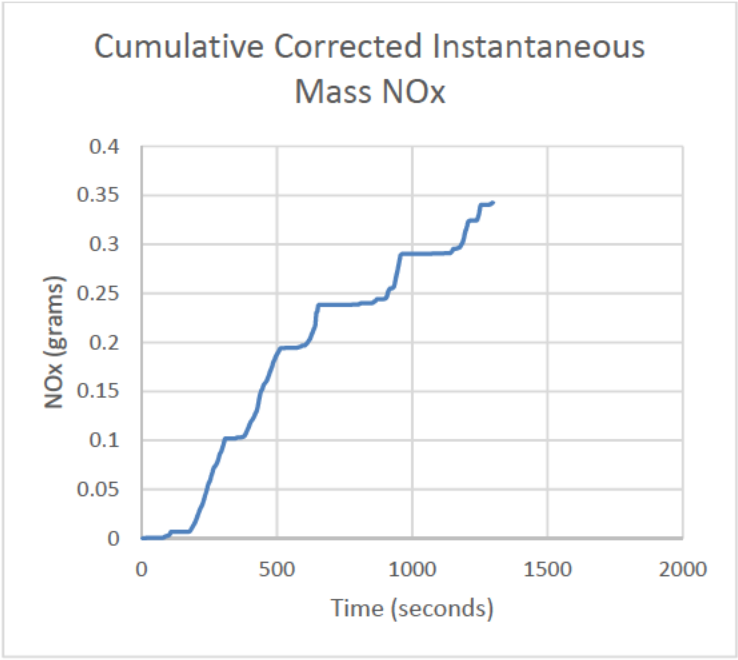


Figure 7.1.6.1: Vehicle 7 – Steady State Cumulative Corrected Instantaneous Mass NOx

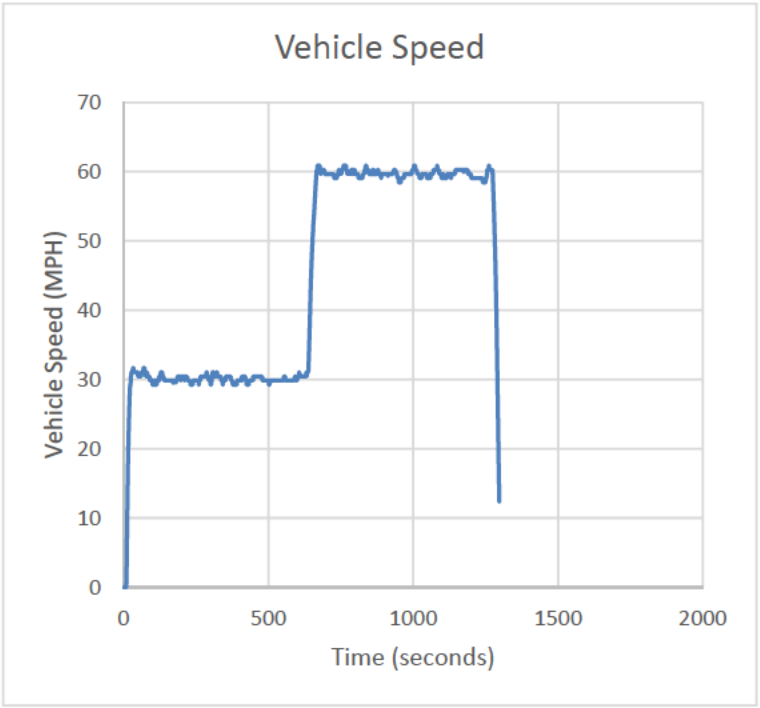


Figure 7.1.7.1: Vehicle 7 – Steady State Vehicle Speed

iii. 80 MPH Steady State Cruise PEMS Test

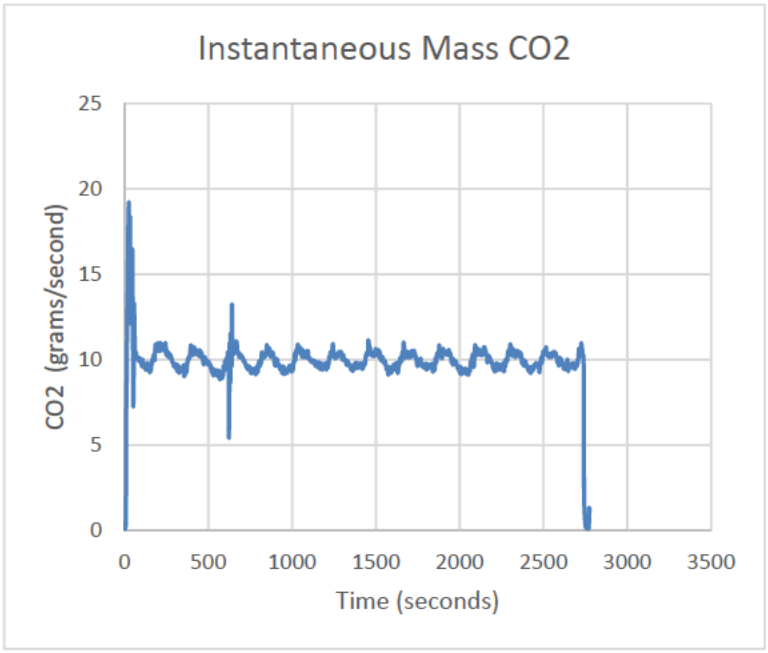


Figure 7.2.1: Vehicle 7 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

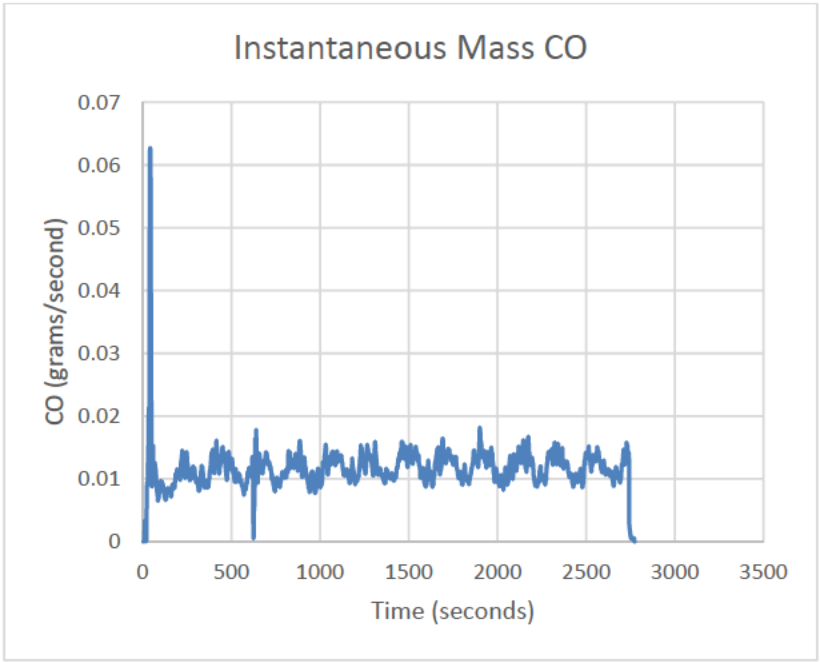


Figure 7.2.2: Vehicle 7 – 80 MPH Steady State Cruise Instantaneous Mass CO

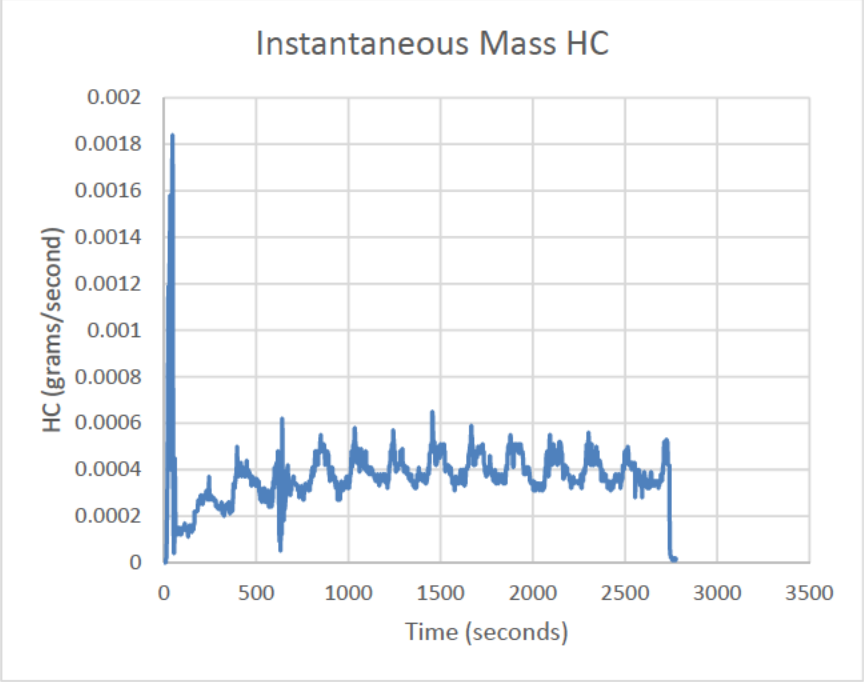


Figure 7.2.3: Vehicle 7 – 80 MPH Steady State Cruise Instantaneous Mass HC

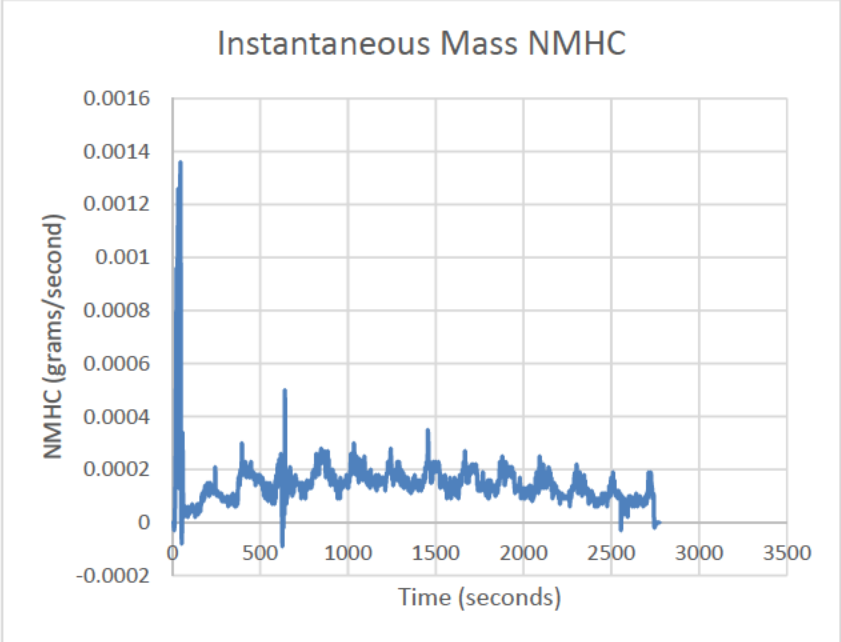


Figure 7.2.4: Vehicle 7 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

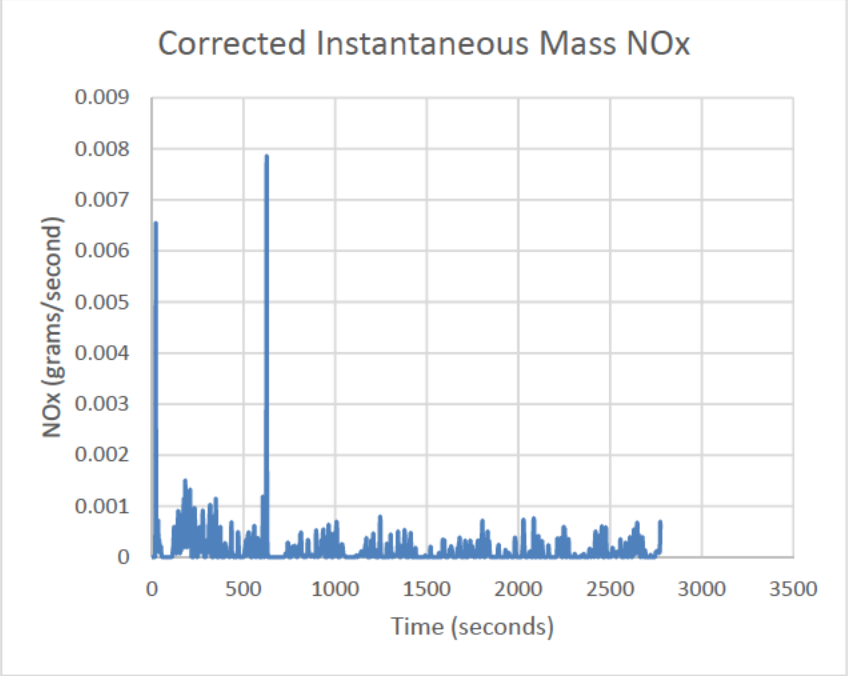


Figure 7.2.5: Vehicle 7 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

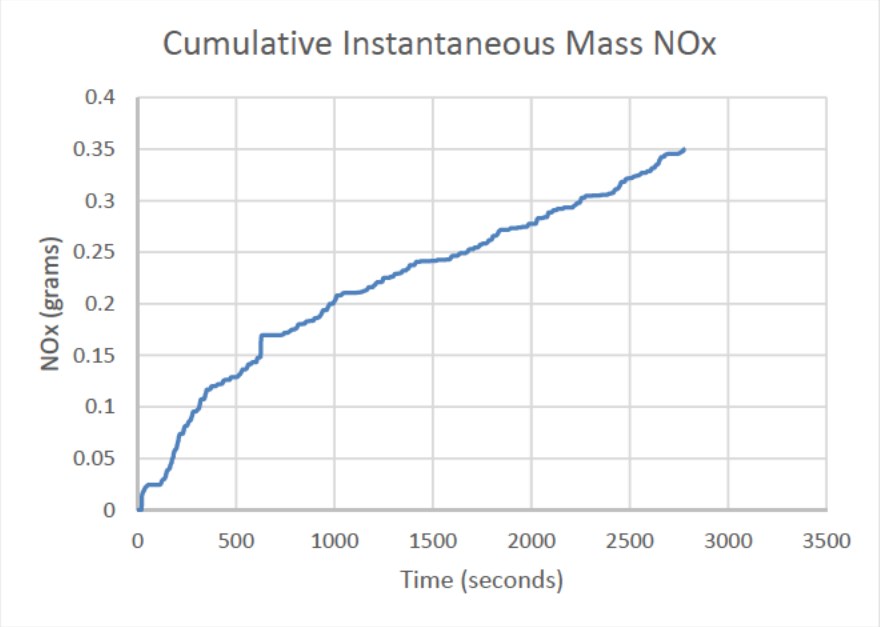


Figure 7.2.6: Vehicle 7 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

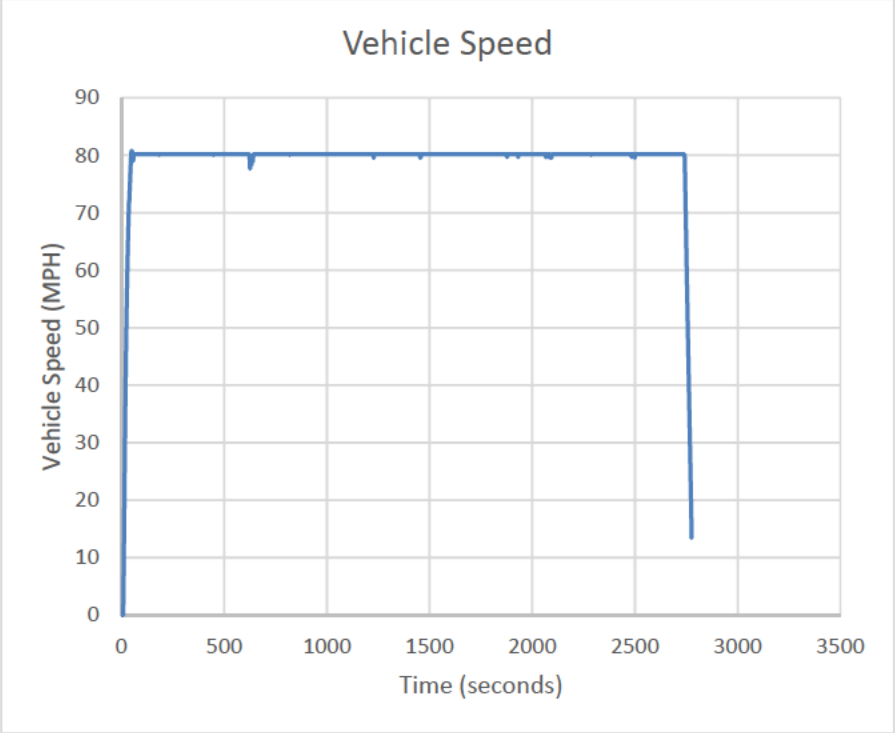


Figure 7.2.7: Vehicle 7 – 80 MPH Steady State Cruise Vehicle Speed

iv. Transient Cycle PEMS Test

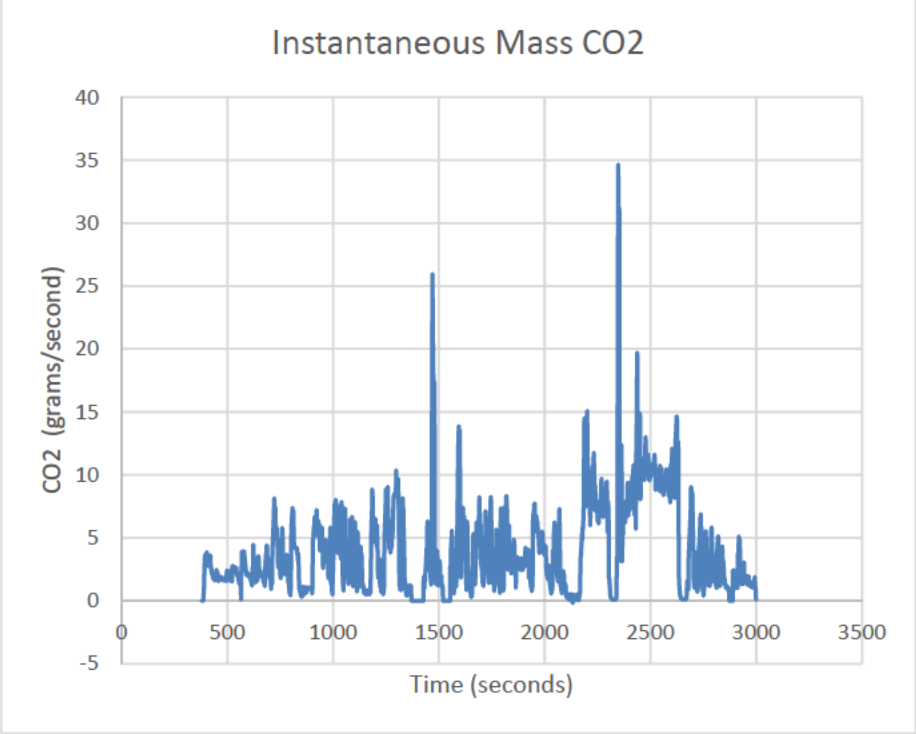


Figure 7.3.1: Vehicle 7 – Transient Cycle Instantaneous Mass CO_2

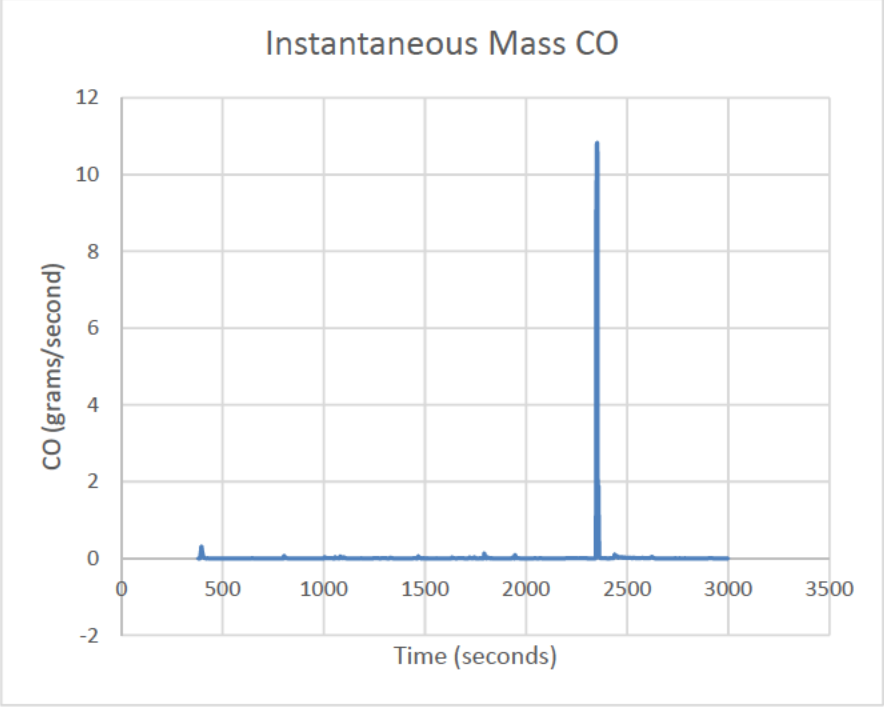


Figure 7.3.2: Vehicle 7 – Transient Cycle Instantaneous Mass CO

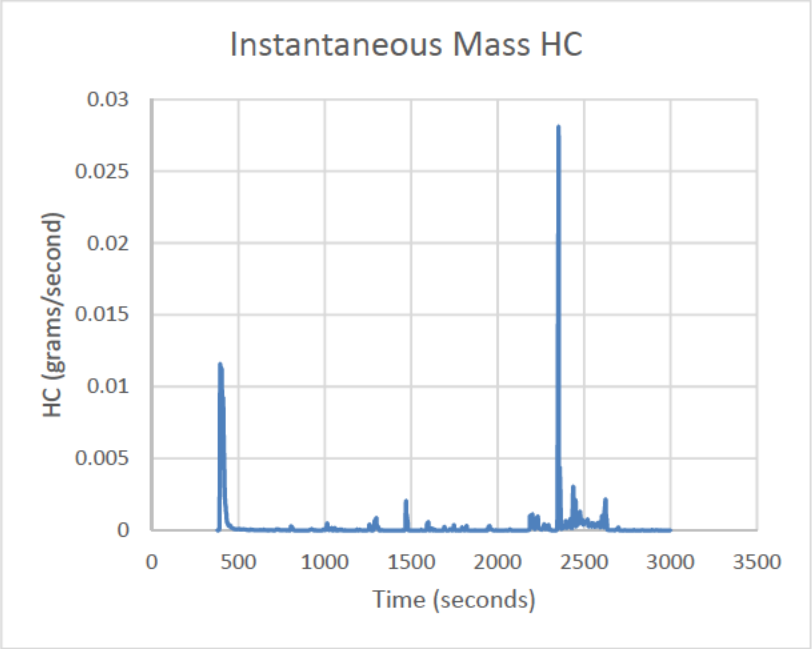


Figure 7.3.3: Vehicle 7 – Transient Cycle Instantaneous Mass HC

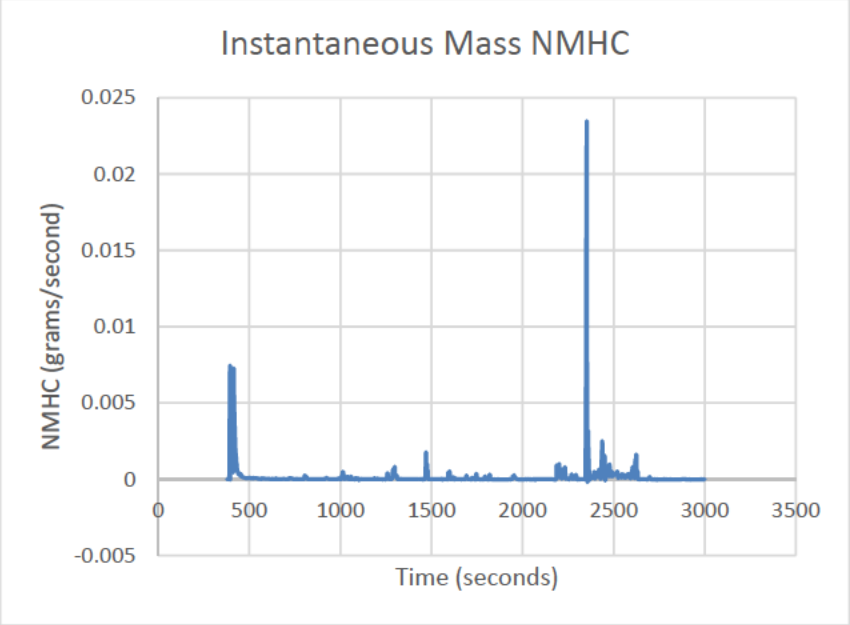


Figure 7.3.4: Vehicle 7 – Transient Cycle Instantaneous Mass NMHC

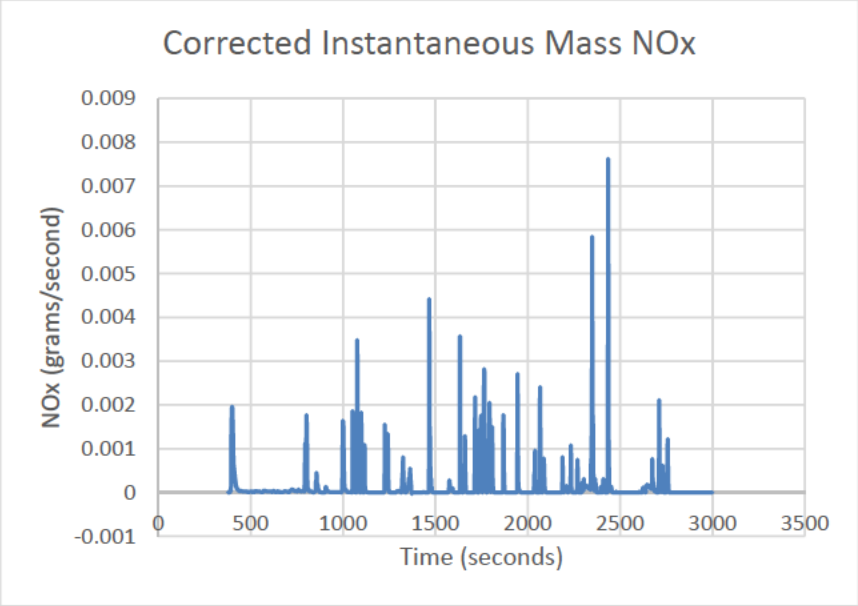


Figure 7.3.5: Vehicle 7 – Transient Cycle Instantaneous Mass NOx

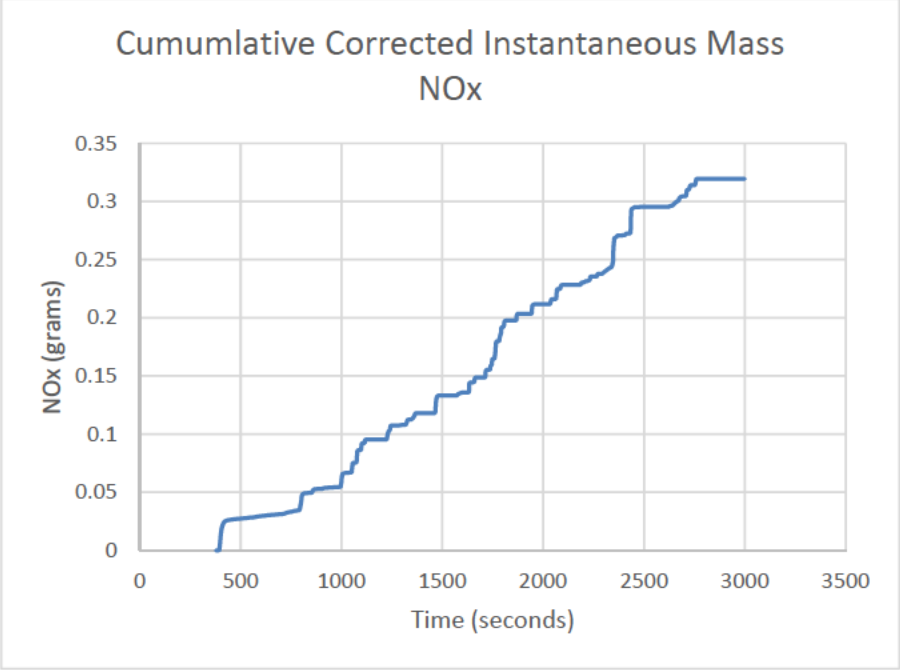


Figure 7.3.6: Vehicle 7 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

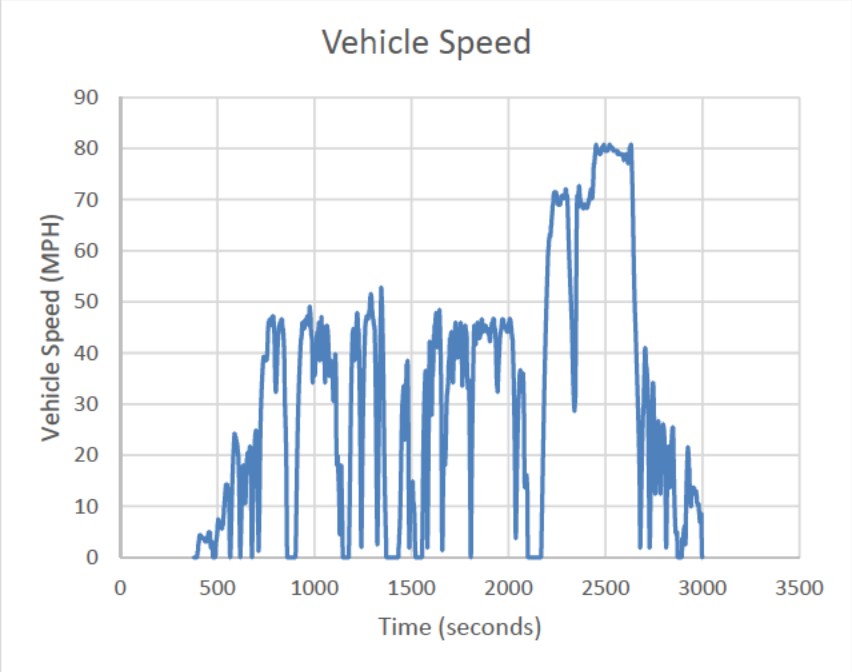


Figure 7.3.7: Vehicle 7 – Transient Cycle Vehicle Speed

8. Vehicle 8 - KCRXT03.65P0 - V9JLJ1947
Jeep Wrangler 3.6L ESS 8-speed Automatic 4WD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0000	278.0427	0.0350	0.0003	0.0003
50	0.0009	375.0443	0.0817	0.0011	0.0018
60	0.0032	400.6892	0.1050	0.0048	0.0073
65	0.0106	438.5006	0.1422	0.0119	0.0182
70	0.0324	490.2808	0.2007	0.0140	0.0270
65	0.0074	437.6842	0.1990	0.0065	0.0193
75	0.1144	551.0253	0.3075	0.0080	0.0251
80	0.0856	609.5621	0.2874	0.0039	0.0164
85	0.0480	672.2694	0.5601	0.0058	0.0237
repeat 75	0.0910	562.3560	0.2043	0.0060	0.0060
repeat 80	0.0991	630.5347	0.6906	0.0173	0.0175
repeat 85	0.0068	682.7188	0.7839	0.0159	0.0160

Table 8.1: Vehicle 8 – Steady State
File: V9JLJ1947_ SSPEMS010119111980
File: V9JLJ1947_SSPEMS010319112580 - Repeat

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.1063	620.5281	0.3896	0.0073	0.0133

Table 8.2: Vehicle 8 – 80 MPH Steady State Cruise
File**:** V9JLJ1947_80SS45010419111980

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.1057	542.9022	0.6560	0.0079	0.0100

Table 8.3: Vehicle 8 – Transient Cycle
File: V9JLJ1947_P-IUVP010319111980

b. Summary Plots

i. Steady State PEMS Test

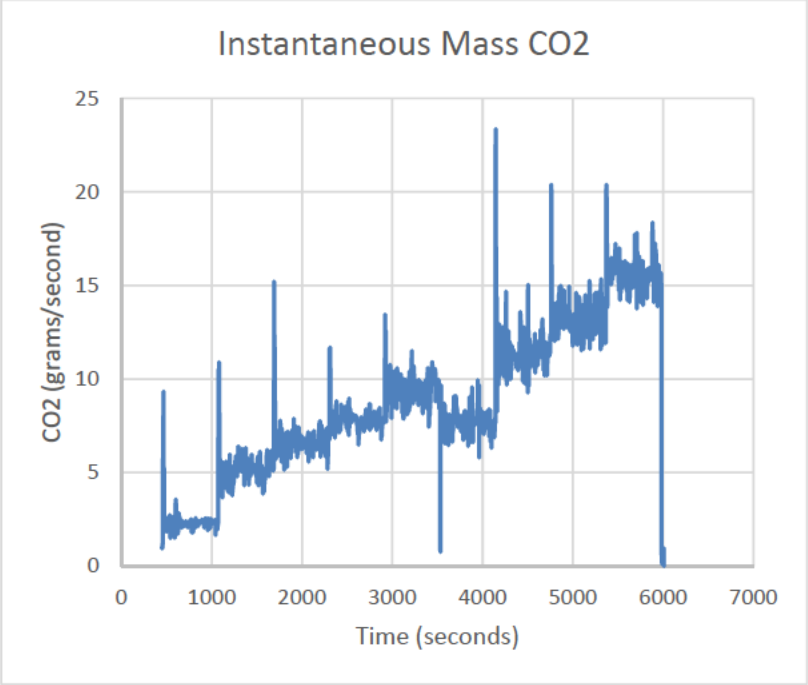


Figure 8.1.1: Vehicle 8 – Steady State Instantaneous Mass CO_2

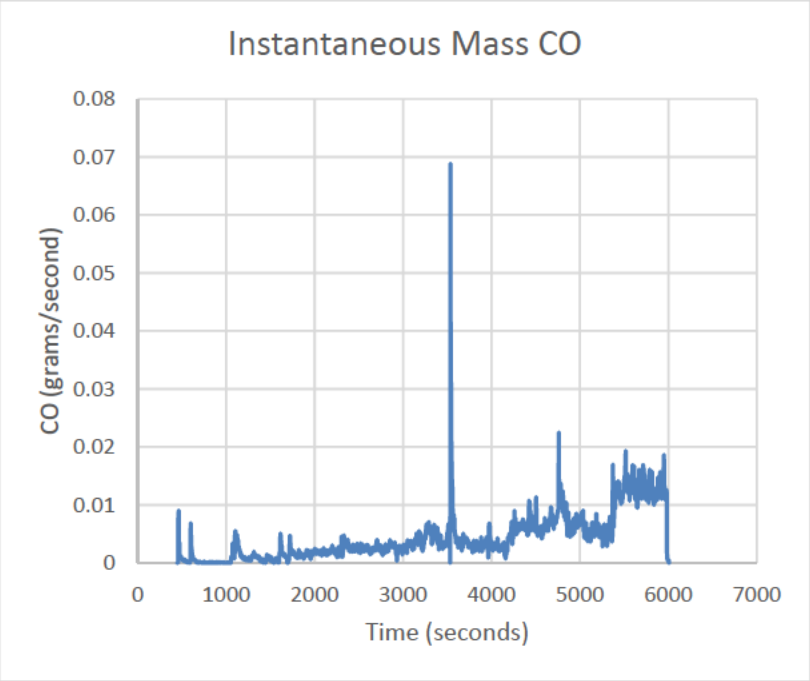


Figure 8.1.2: Vehicle 8 – Steady State Instantaneous Mass CO

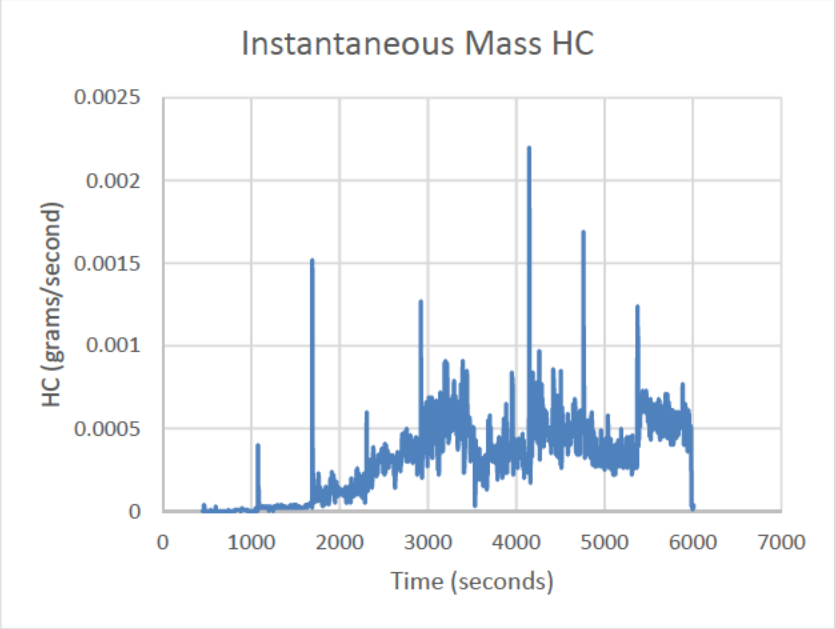


Figure 8.1.3: Vehicle 8 – Steady State Instantaneous Mass HC

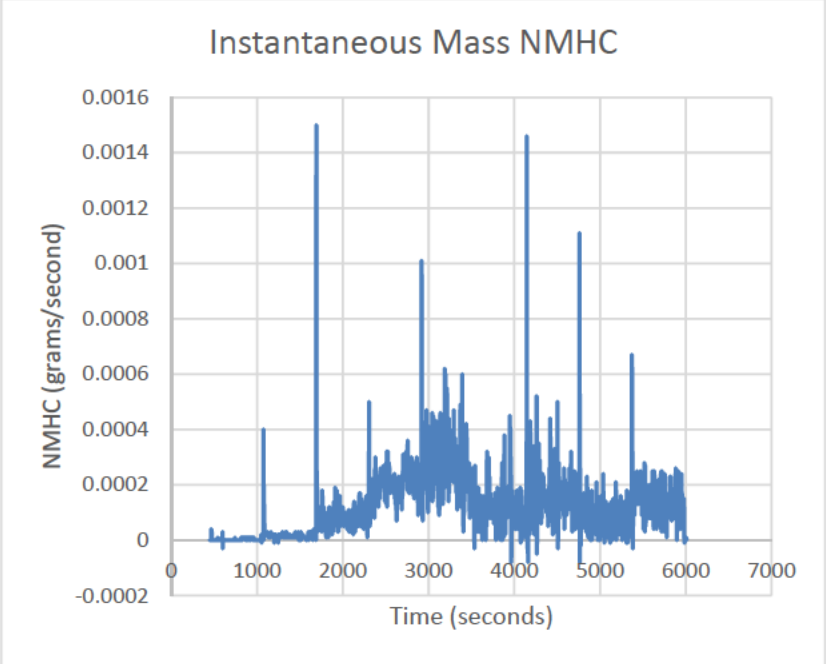


Figure 8.1.4: Vehicle 8 – Steady State Instantaneous Mass NMHC

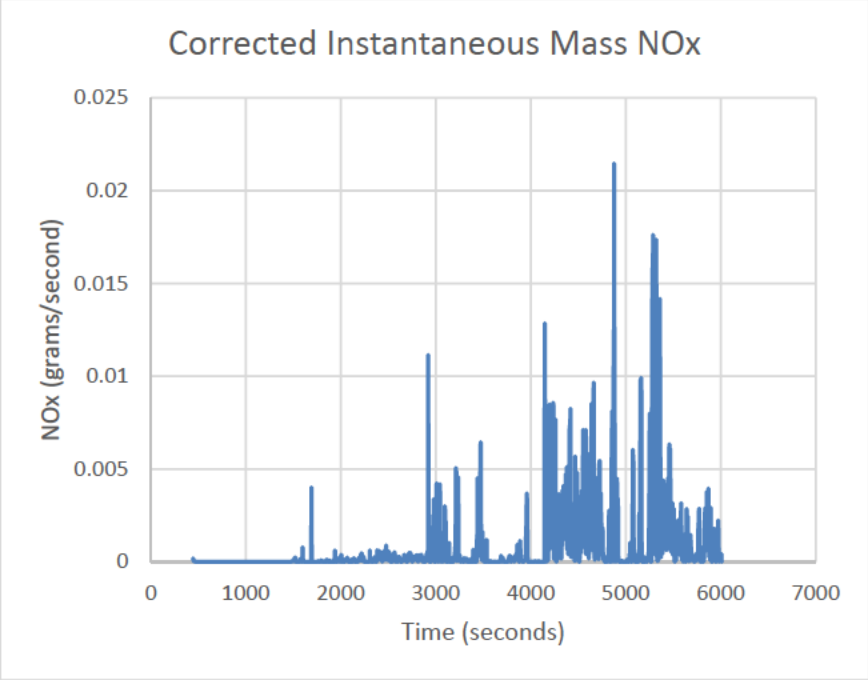


Figure 8.1.5: Vehicle 8 – Steady State Corrected Instantaneous Mass NOx

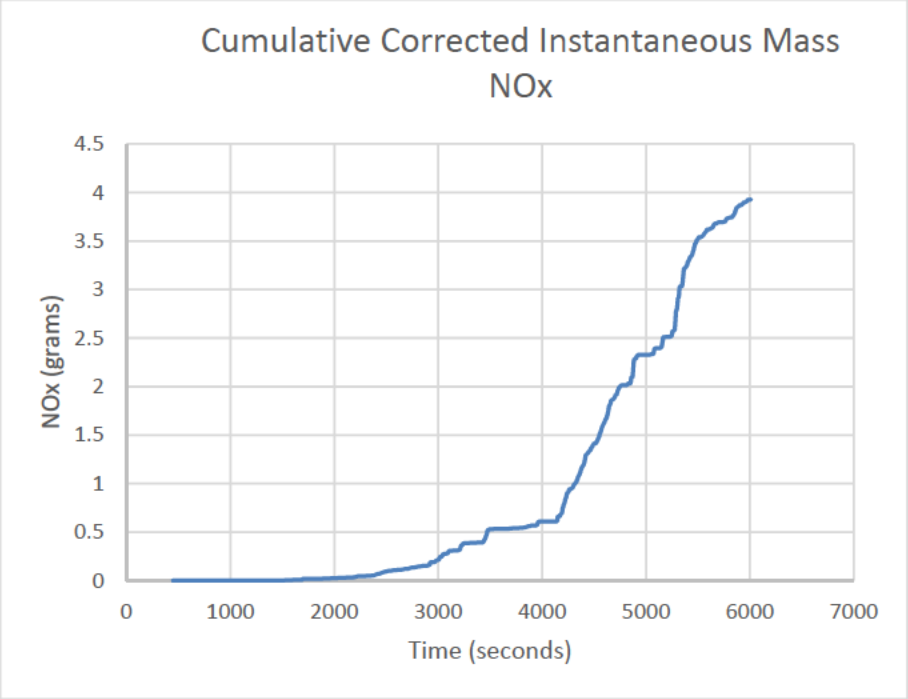


Figure 8.1.6: Vehicle 8 – Steady State Cumulative Corrected Instantaneous Mass NOx

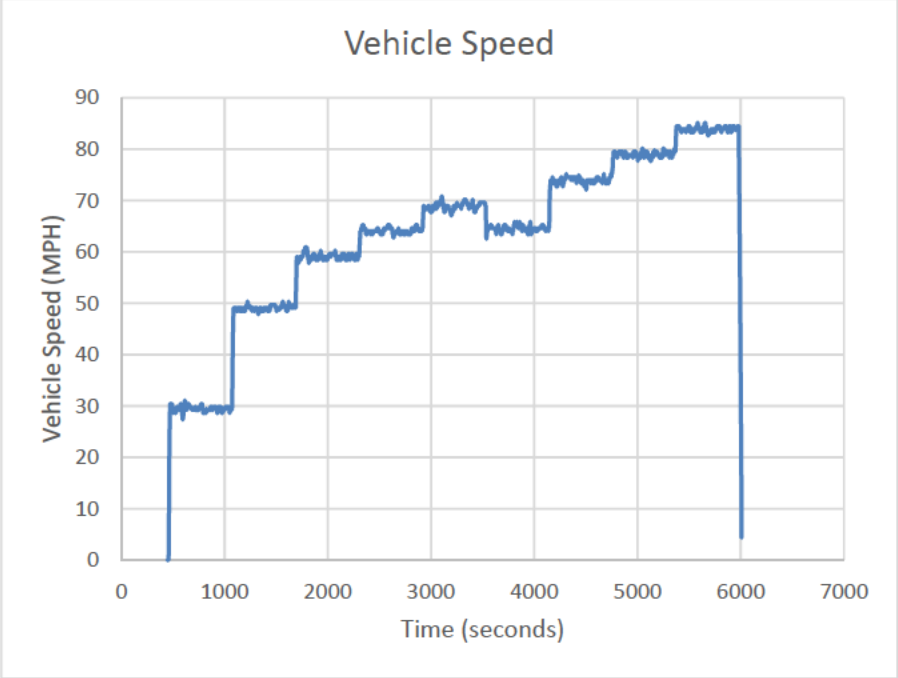


Figure 8.1.7: Vehicle 8 – Steady State Vehicle Speed

ii. Steady State PEMS Test – Repeat

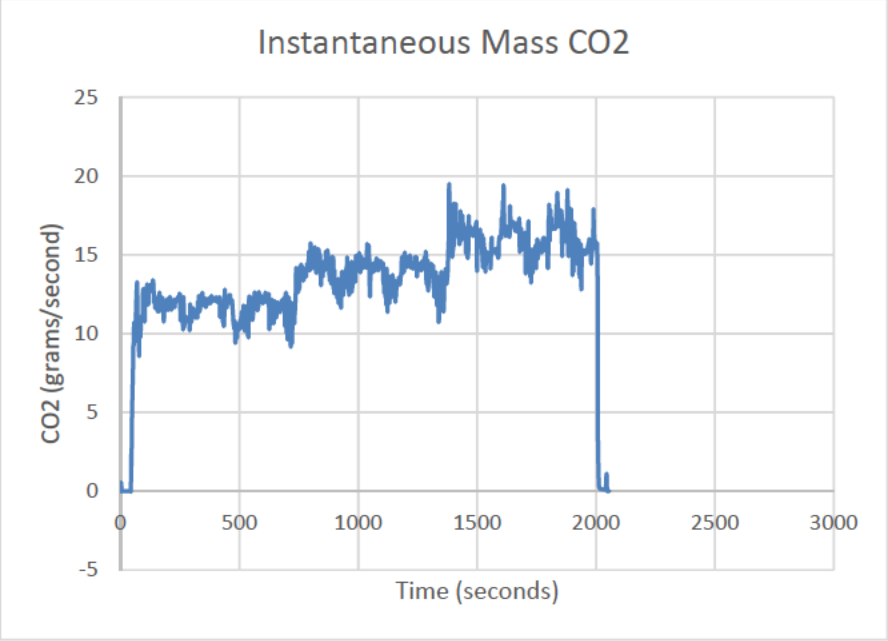


Figure 8.1.1.1: Vehicle 8 – Steady State Instantaneous Mass CO_2

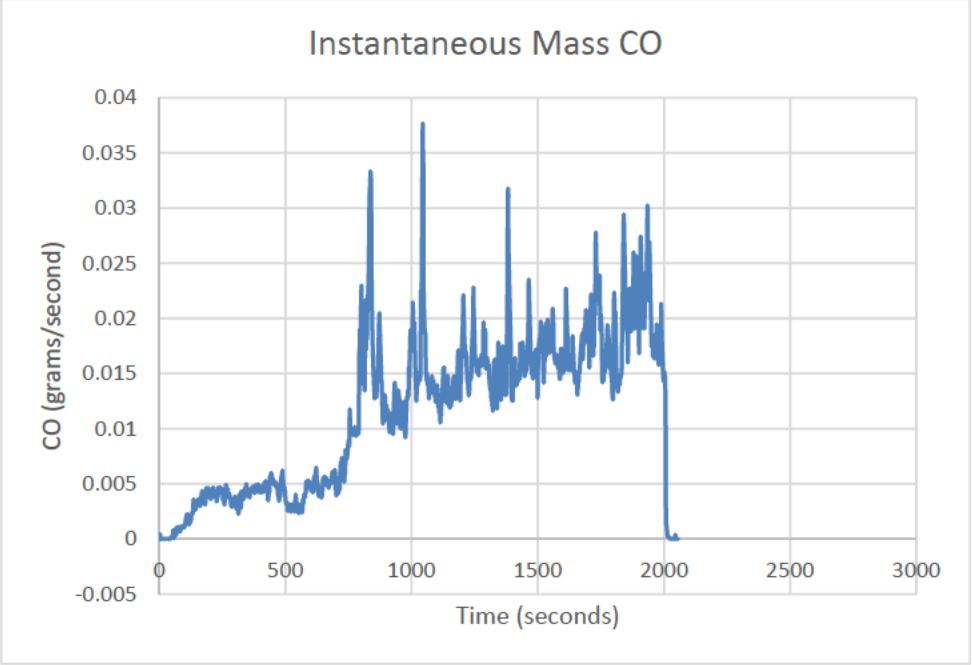


Figure 8.1.2.1: Vehicle 8 – Steady State Instantaneous Mass CO

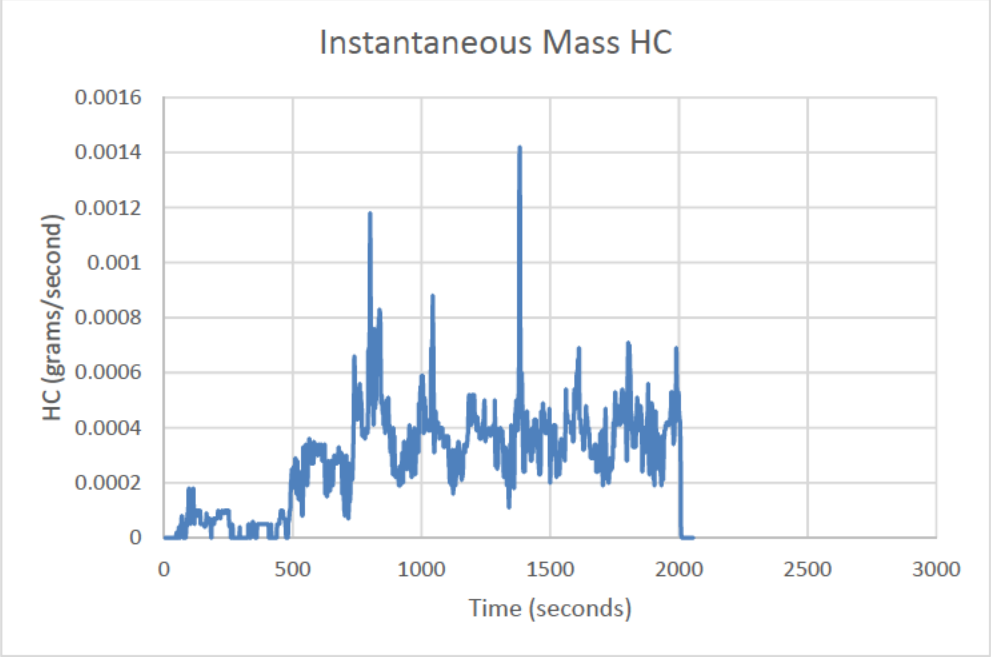


Figure 8.1.3.1: Vehicle 8 – Steady State Instantaneous Mass HC

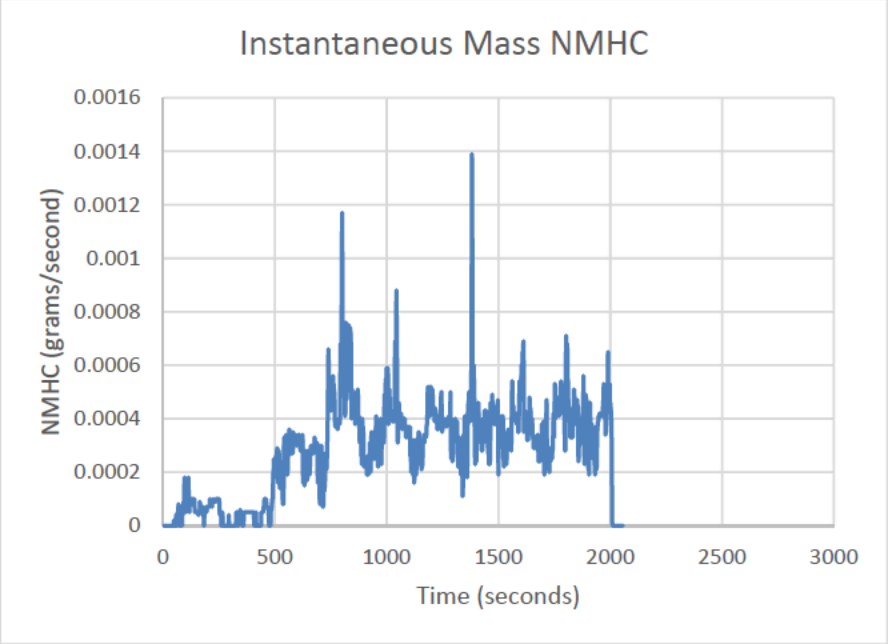


Figure 8.1.4.1: Vehicle 8 – Steady State Instantaneous Mass NMHC

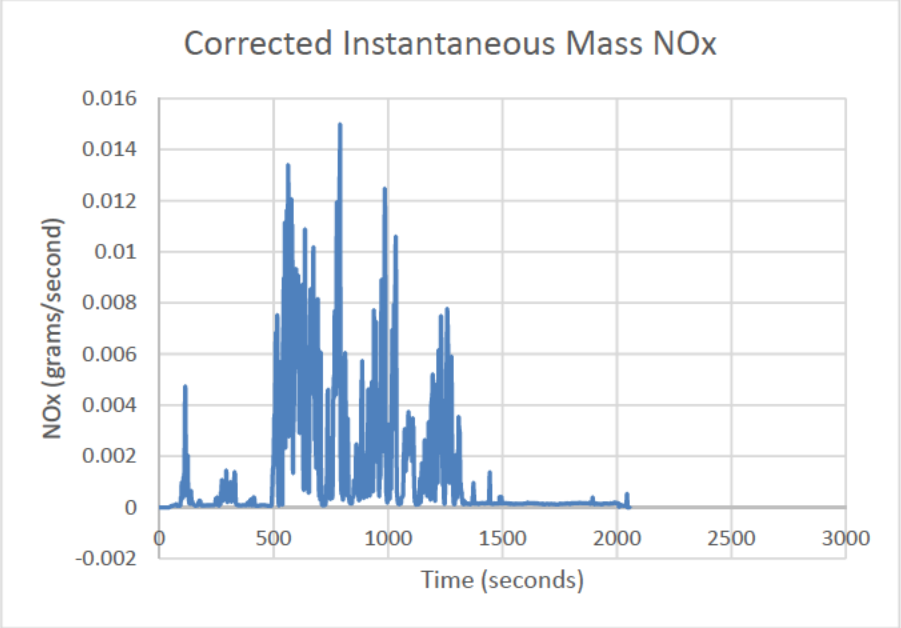


Figure 8.1.5.1: Vehicle 8 – Steady State Corrected Instantaneous Mass NOx

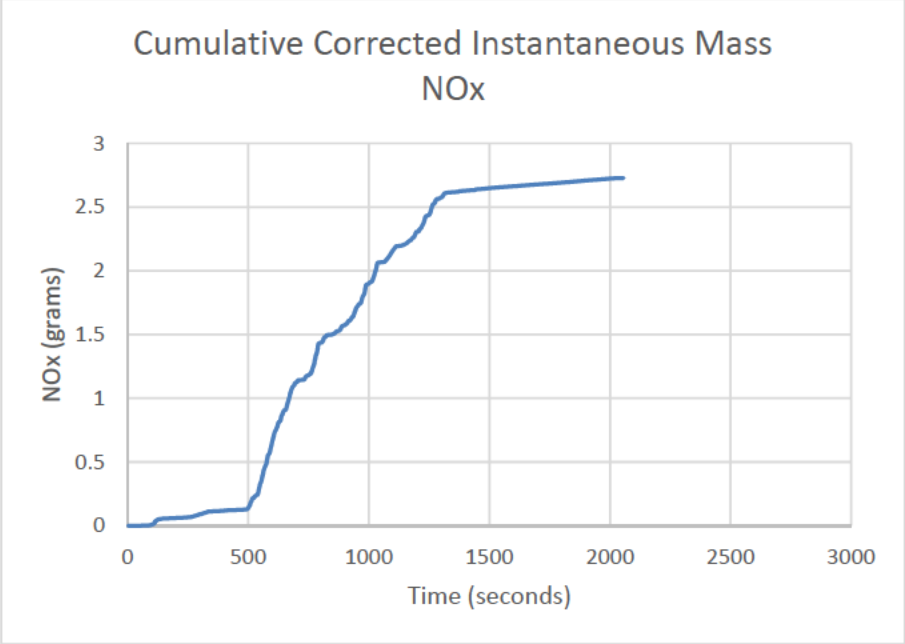


Figure 8.1.6.1: Vehicle 8 – Steady State Cumulative Corrected Instantaneous Mass NOx

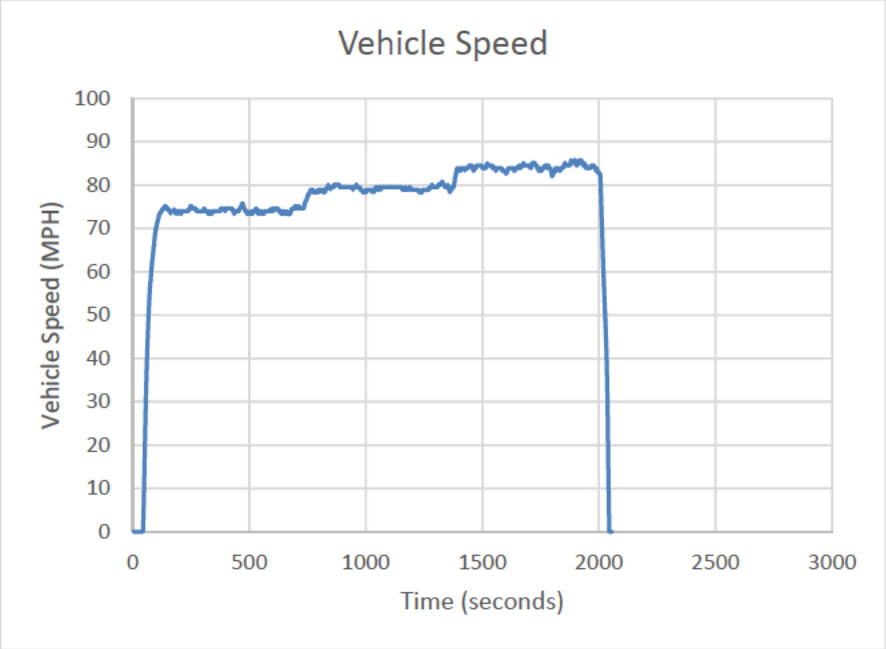


Figure 8.1.7.1: Vehicle 8 – Steady State Vehicle Speed

iii. 80 MPH Steady State Cruise PEMS Test

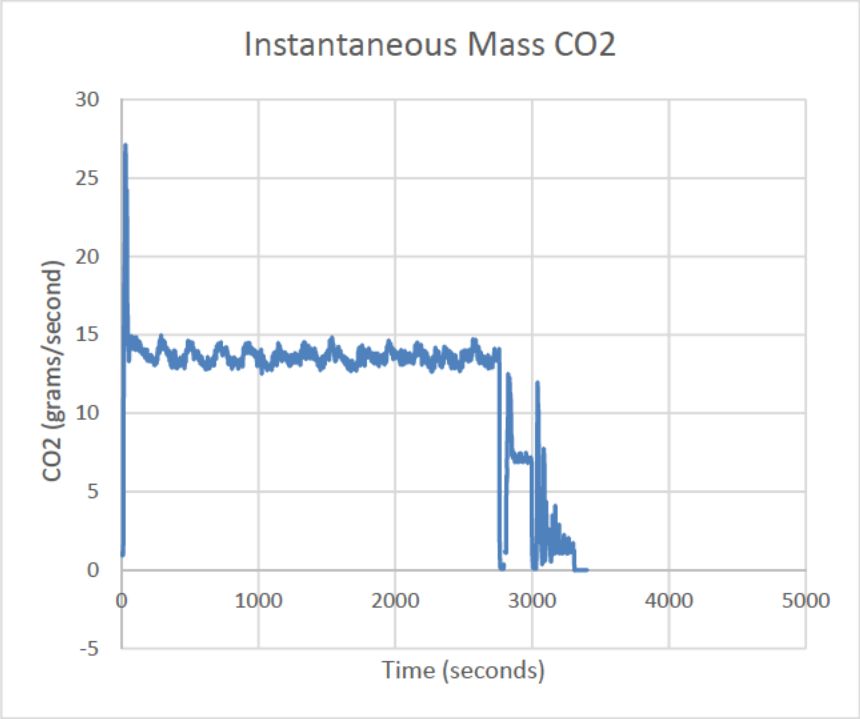


Figure 8.2.1: Vehicle 8 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

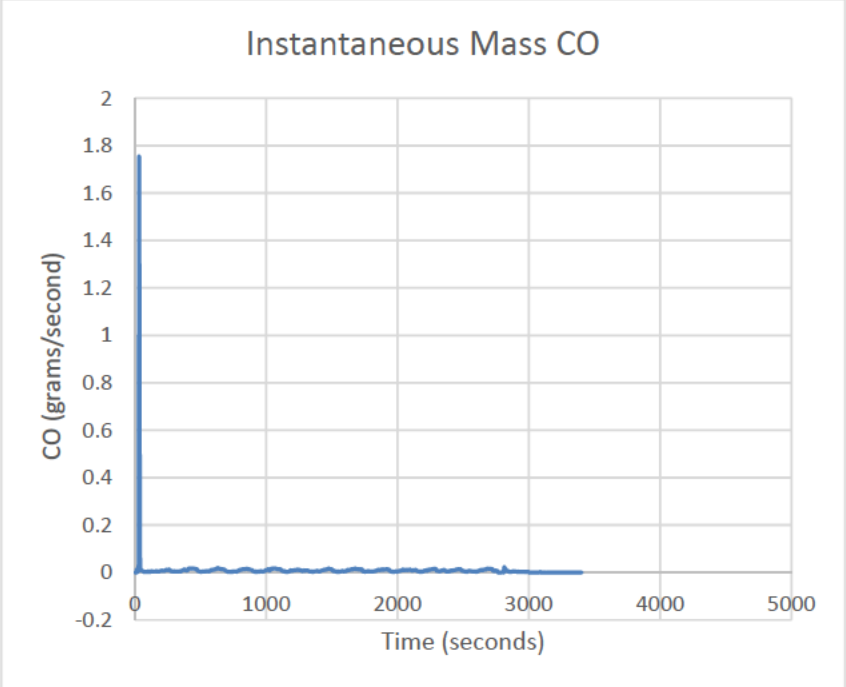


Figure 8.2.2: Vehicle 8 – 80 MPH Steady State Cruise Instantaneous Mass CO

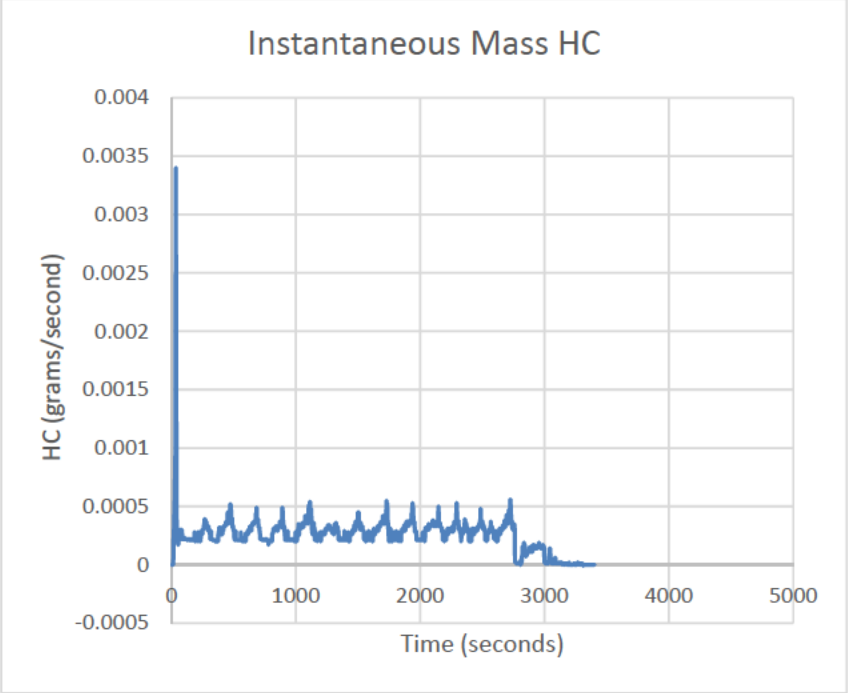


Figure 8.2.3: Vehicle 8 – 80 MPH Steady State Cruise Instantaneous Mass HC

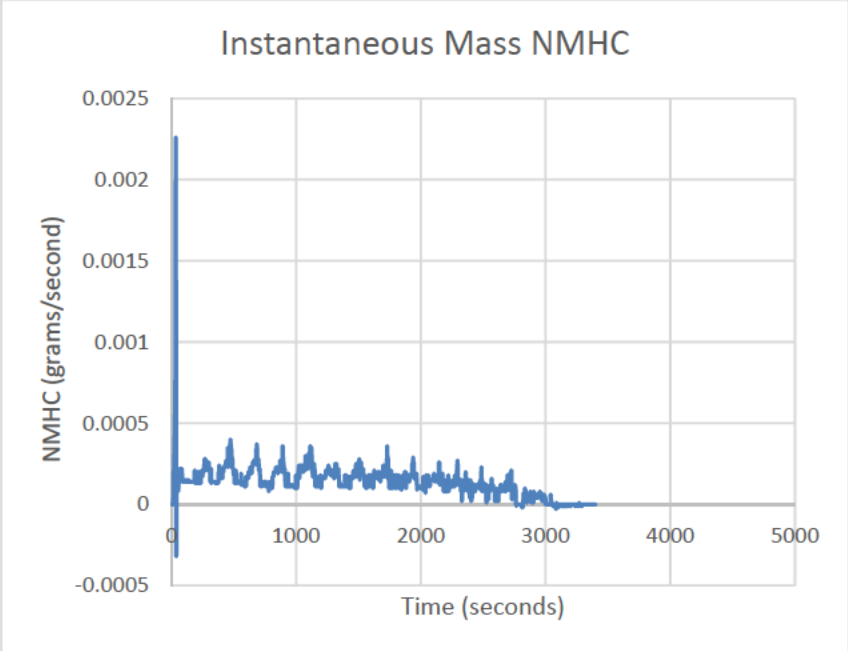


Figure 8.2.4: Vehicle 8 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

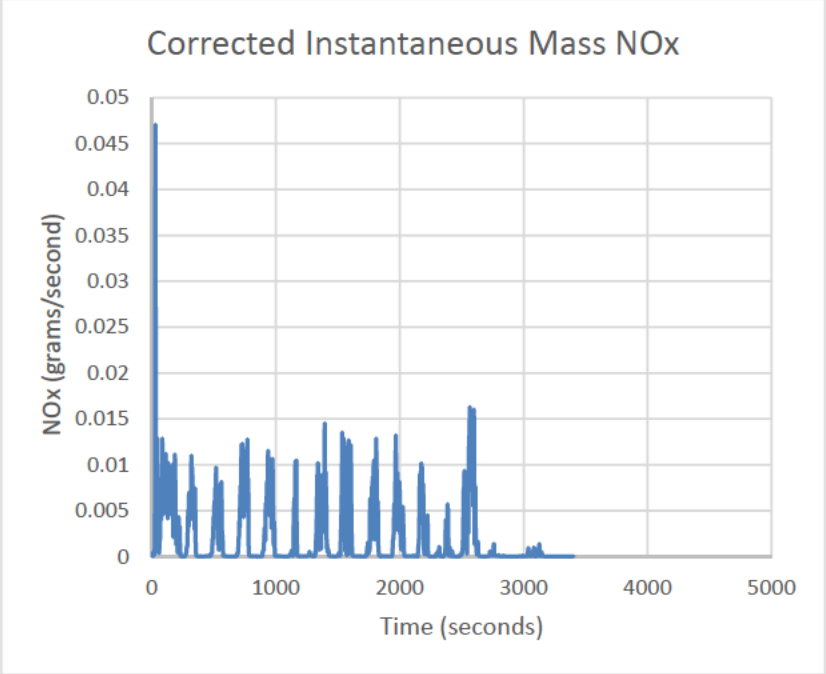


Figure 8.2.5: Vehicle 8 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

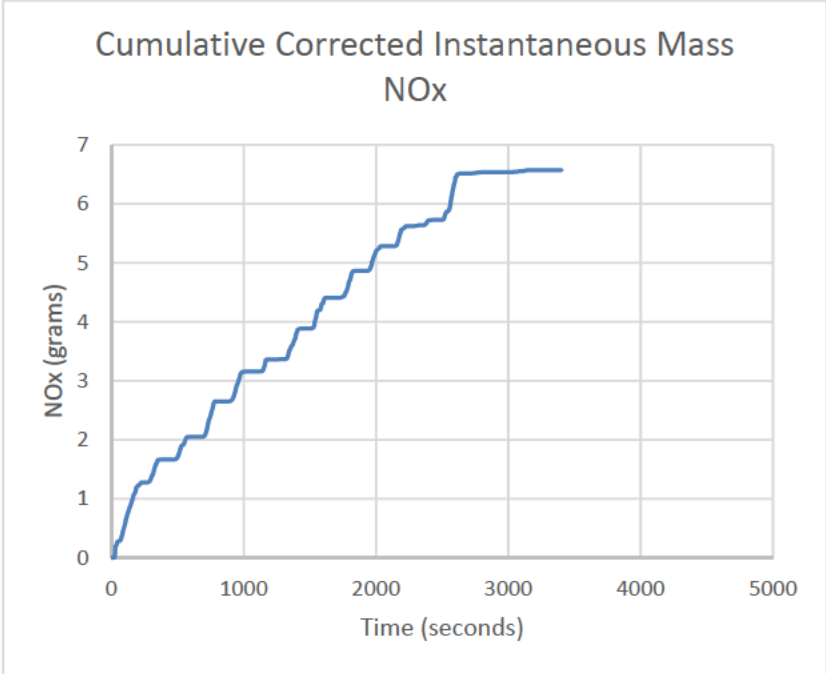


Figure 8.2.6: Vehicle 8 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

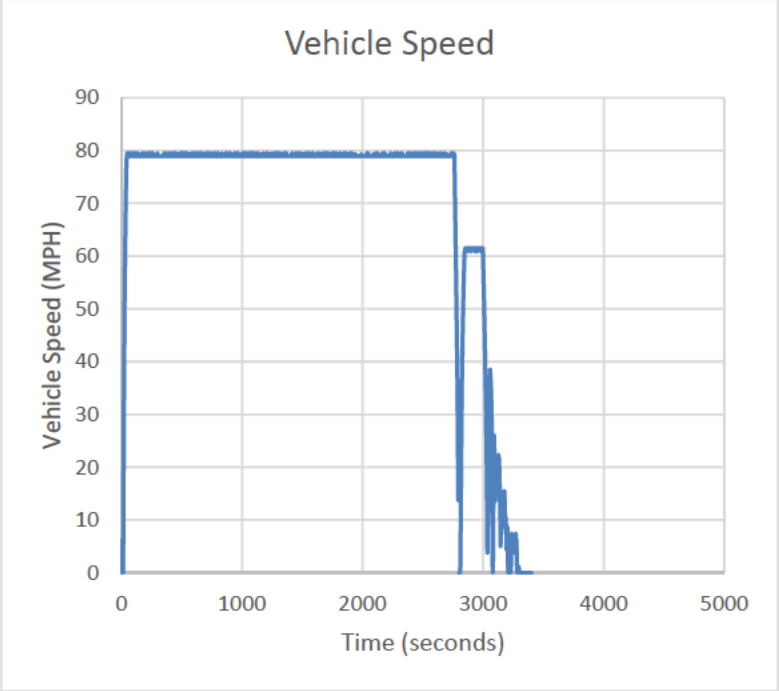


Figure 8.2.7: Vehicle 8 – 80 MPH Steady State Cruise Vehicle Speed

iv. Transient Cycle PEMS Test

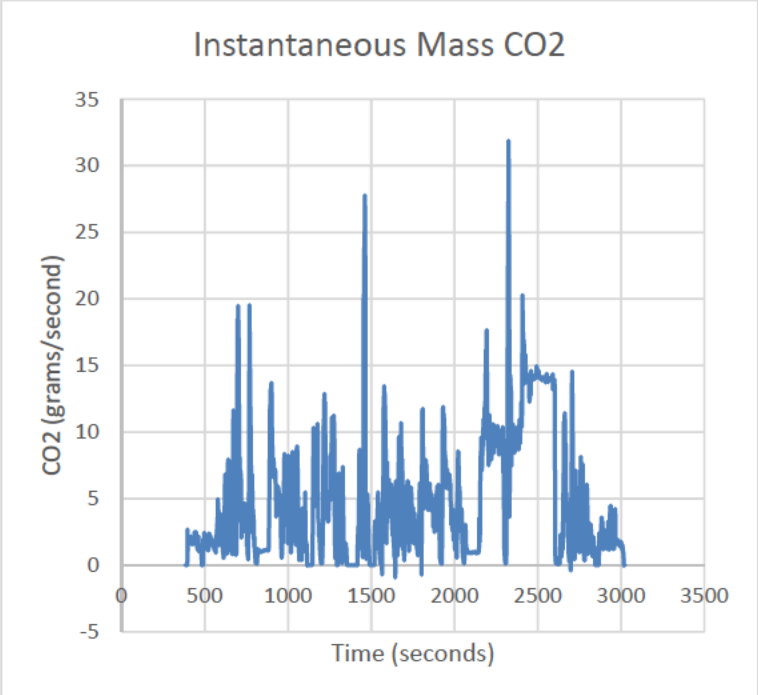


Figure 8.3.1: Vehicle 8 – Transient Cycle Instantaneous Mass CO_2

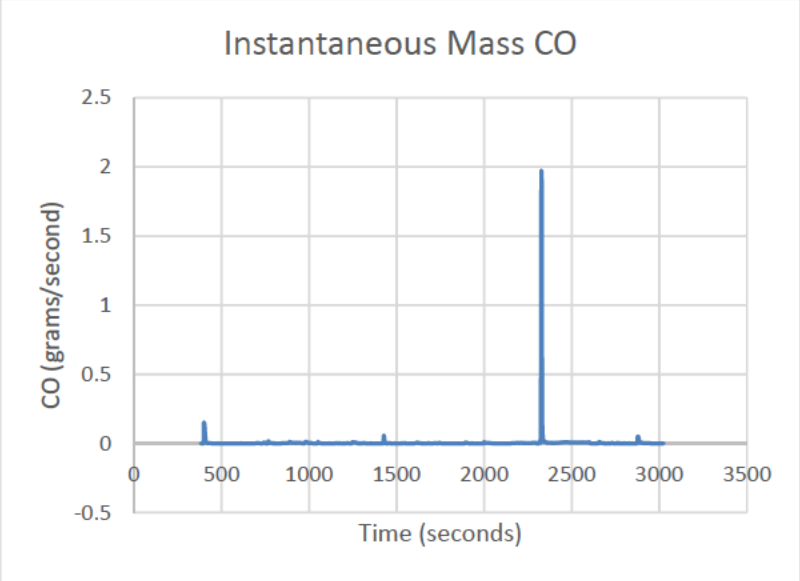


Figure 8.3.2: Vehicle 8 – Transient Cycle Instantaneous Mass CO

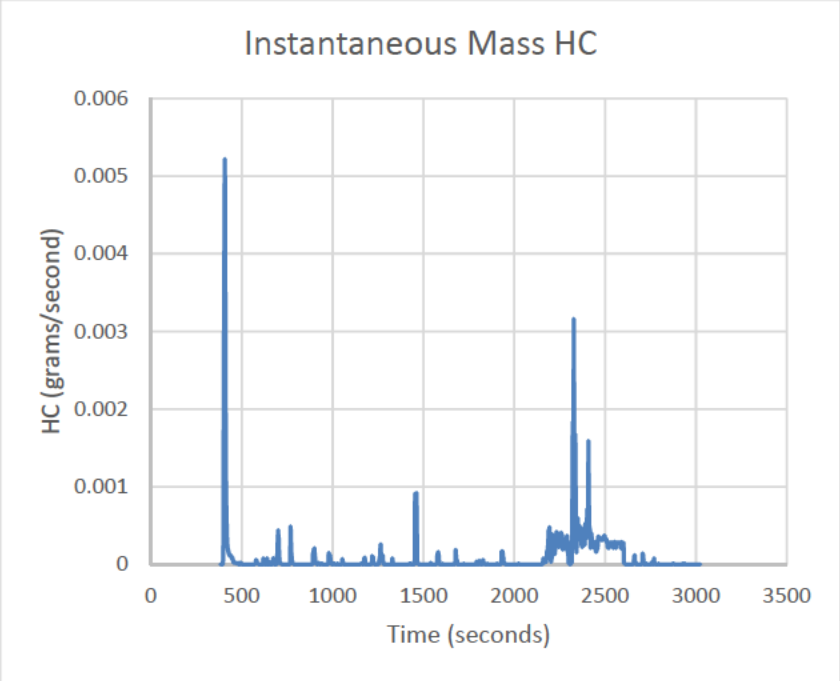


Figure 8.3.3: Vehicle 8 – Transient Cycle Instantaneous Mass HC

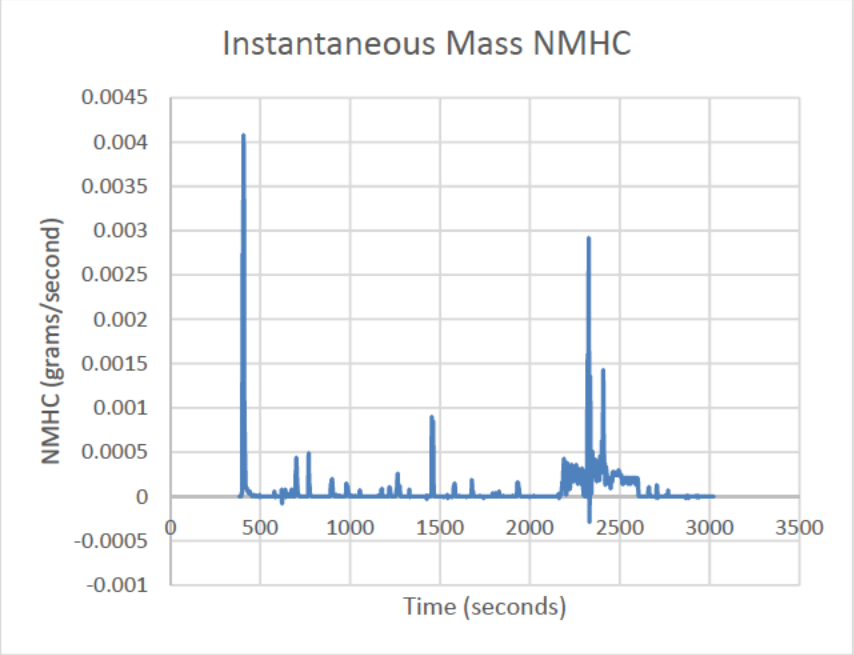


Figure 8.3.4: Vehicle 8 – Transient Cycle Instantaneous Mass NMHC

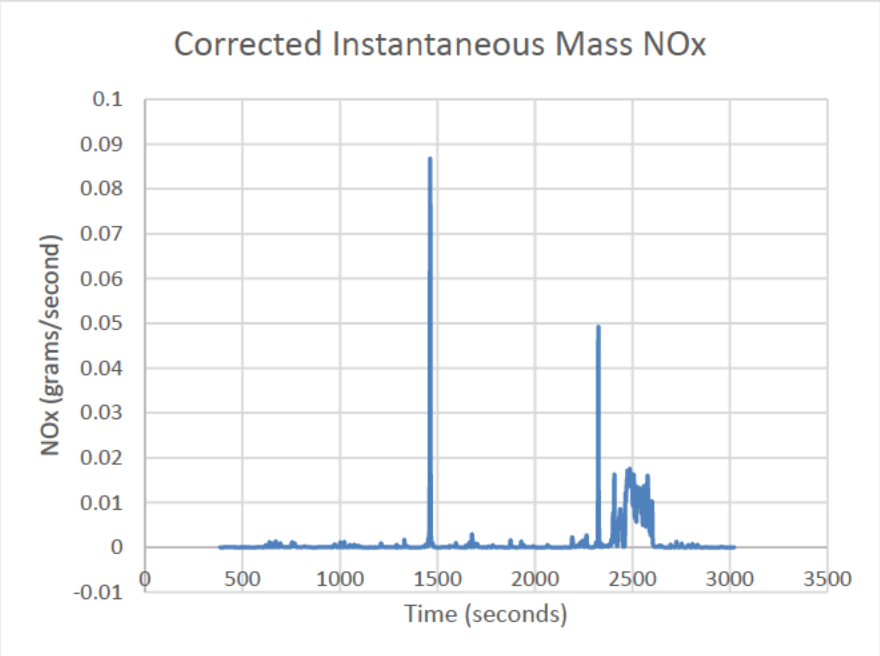


Figure 8.3.5: Vehicle 8 – Transient Cycle Instantaneous Mass NOx

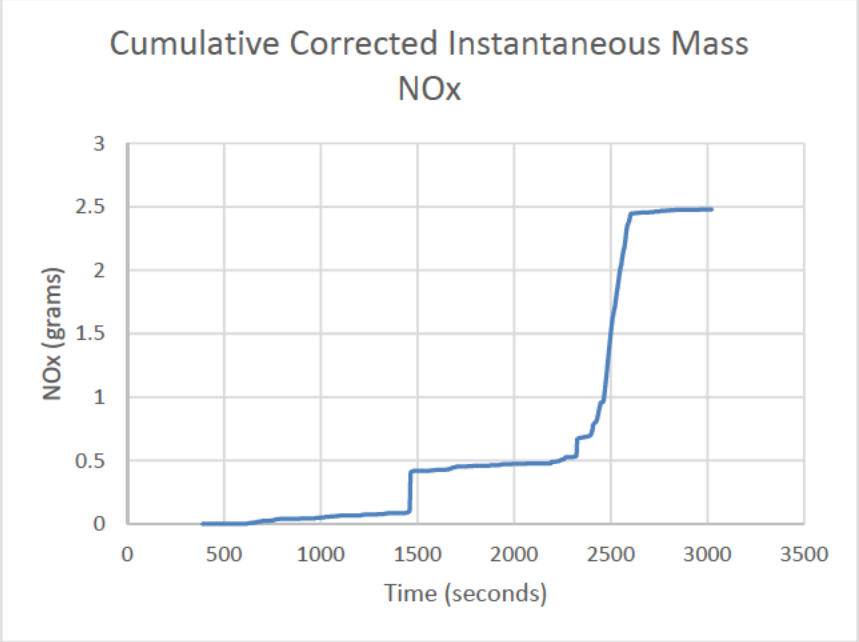


Figure 8.3.6: Vehicle 8 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

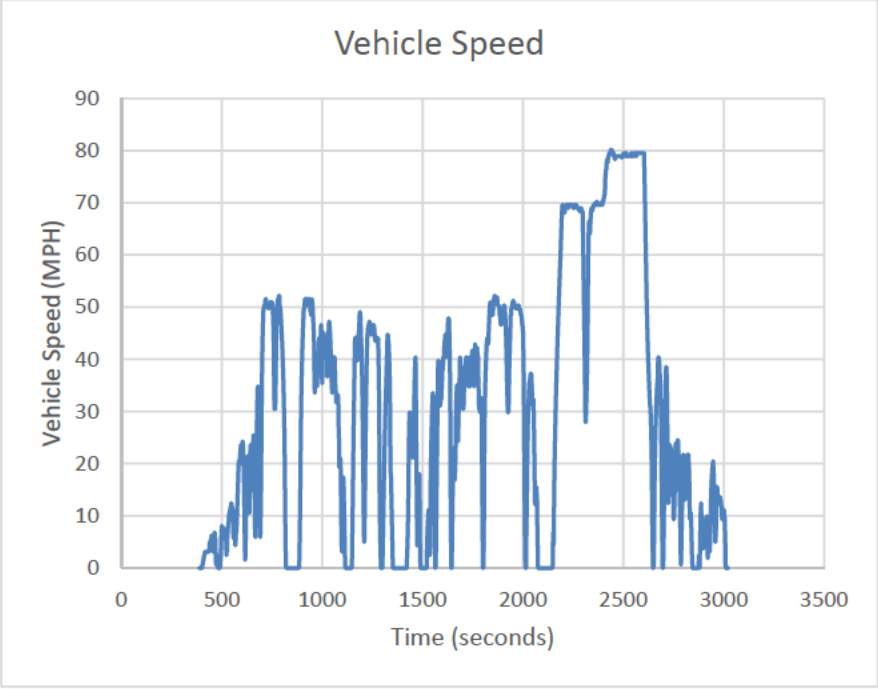


Figure 8.3.7: Vehicle 8 – Transient Cycle Vehicle Speed

9. Vehicle 9 – KCRXT03.65P7 - V9DT11695 Ram 3.6L V6 BSG 8-speed Automatic 2WD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0000	239.4514	0.1262	0.0000	0.0000
50	0.0000	288.0341	0.0458	-0.0001	0.0000
60	0.0000	342.7996	0.2510	0.0010	0.0022
65	0.0000	362.7482	0.2939	0.0052	0.0100
70	0.0003	406.2760	0.7483	0.0382	0.0740
65	0.0000	363.4631	0.4914	0.0043	0.0178
75	0.0021	450.0754	1.1762	0.0259	0.1040
80	0.0000	494.1050	0.7839	0.0089	0.0499
85	0.0003	536.0134	1.2359	0.0152	0.0759

Table 9.1: Vehicle 9 – Steady State
File: V9DT11695_SSPEMS010419112080

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0011	502.1494	0.9334	0.0337	0.0610

Table 9.2: Vehicle 9 – 80 MPH Steady State Cruise
File: V9DT11695_80SS45010319112080

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0166	475.1574	4.5478	0.0236	0.0371

Table 9.3: Vehicle 9 – Transient Cycle
File: V9DT11695_P-IUVP010219112080

b. Summary Plots

i. Steady State PEMS Test

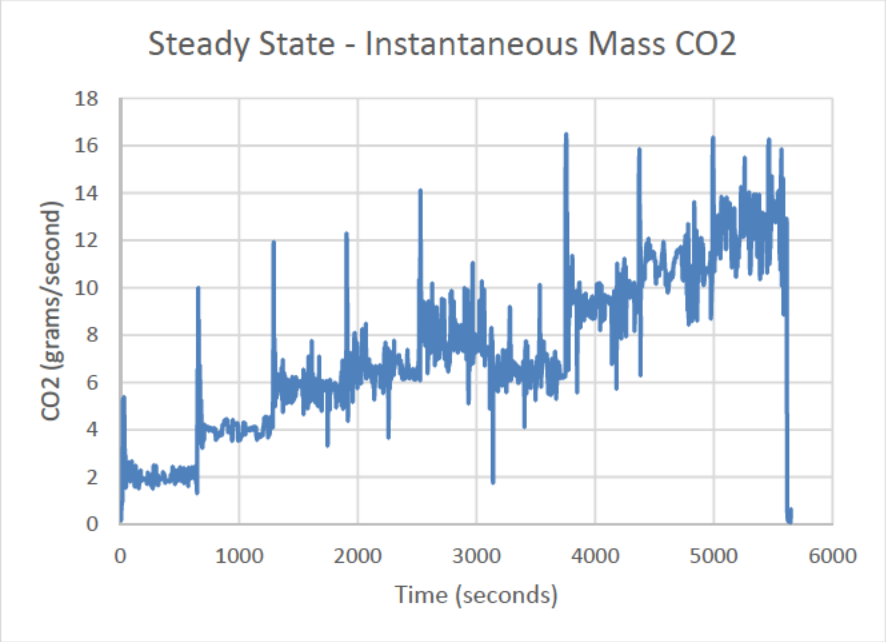


Figure 9.1.1: Vehicle 9 – Steady State Instantaneous Mass CO_2

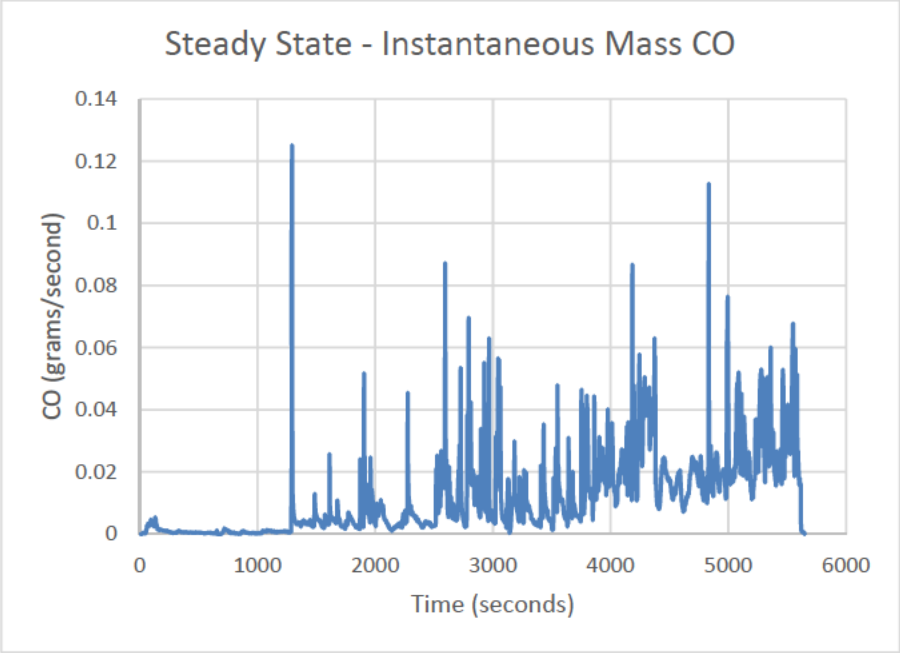


Figure 9.1.2: Vehicle 9 – Steady State Instantaneous Mass CO

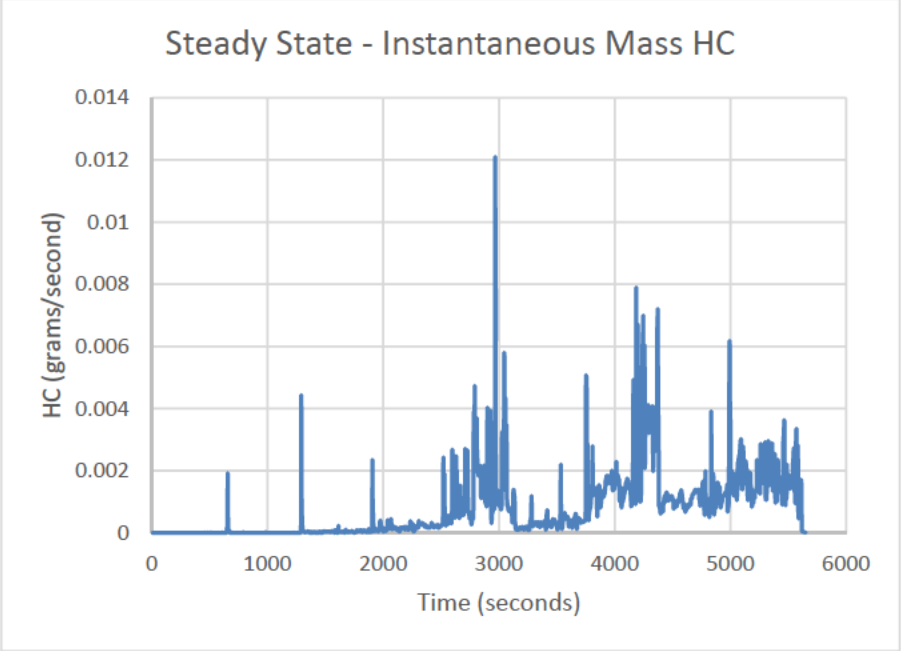


Figure 9.1.3: Vehicle 9 – Steady State Instantaneous Mass HC

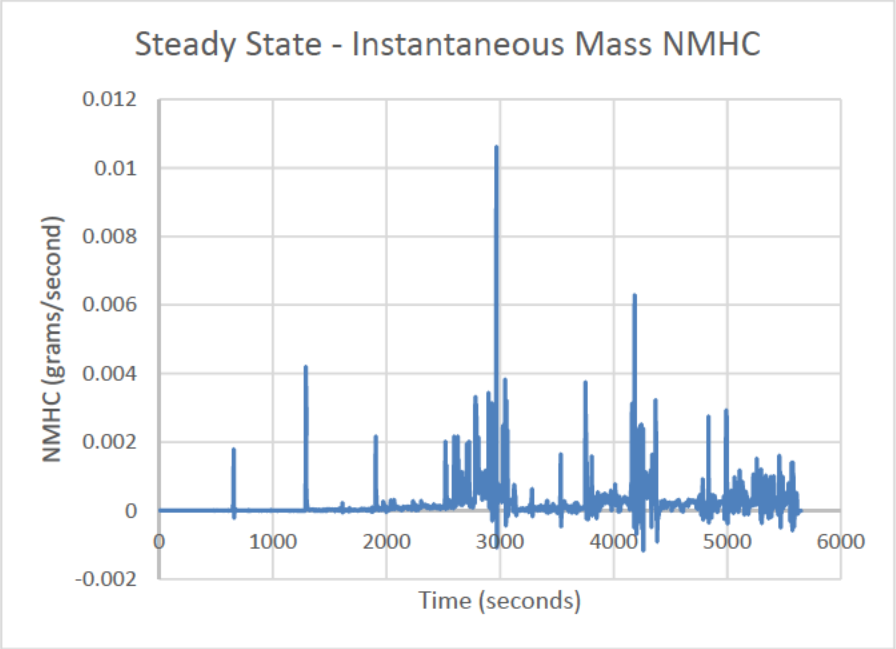


Figure 9.1.4: Vehicle 9 – Steady State Instantaneous Mass NMHC

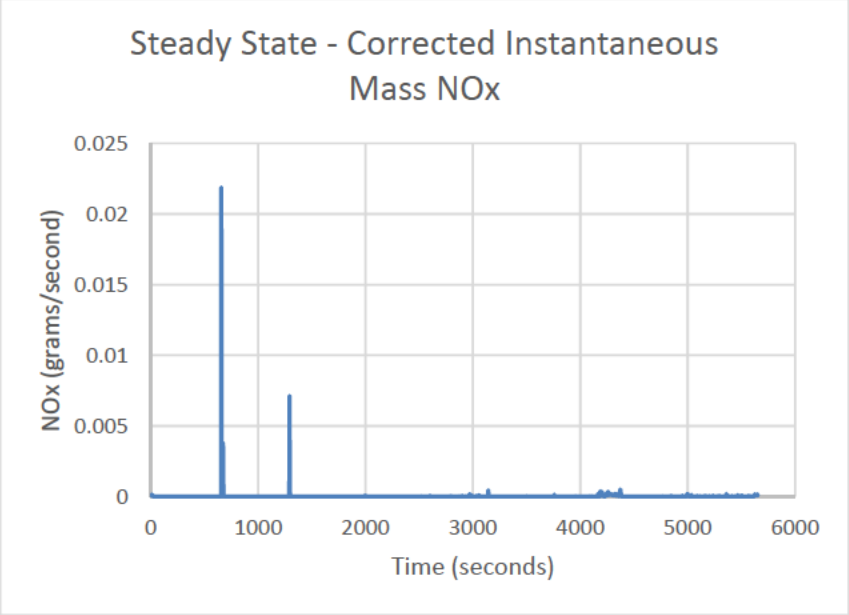


Figure 9.1.5: Vehicle 9 – Steady State Corrected Instantaneous Mass NOx

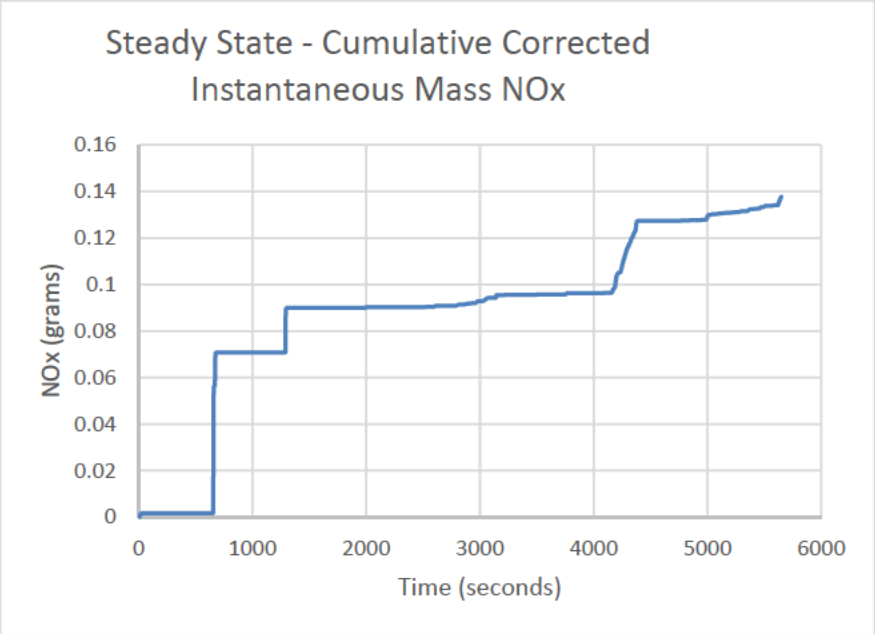


Figure 9.1.6: Vehicle 9 – Steady State Cumulative Corrected Instantaneous Mass NOx

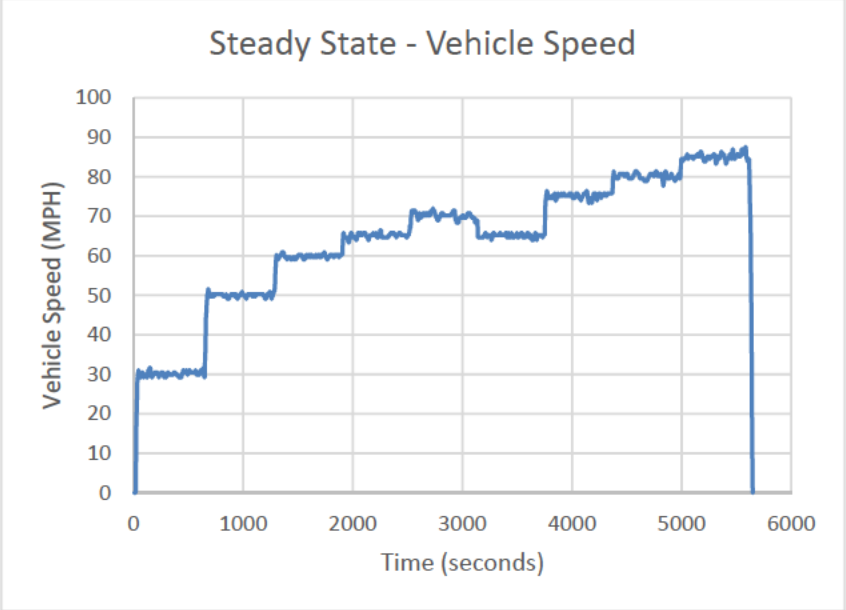


Figure 9.1.7: Vehicle 9 – Steady State Vehicle Speed

ii. 80 MPH Steady State Cruise PEMS Test

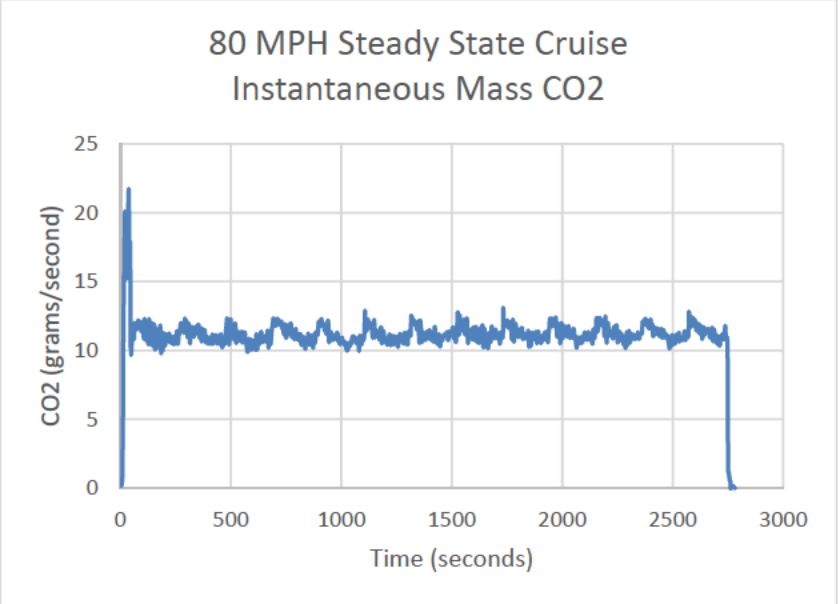


Figure 9.2.1: Vehicle 9 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

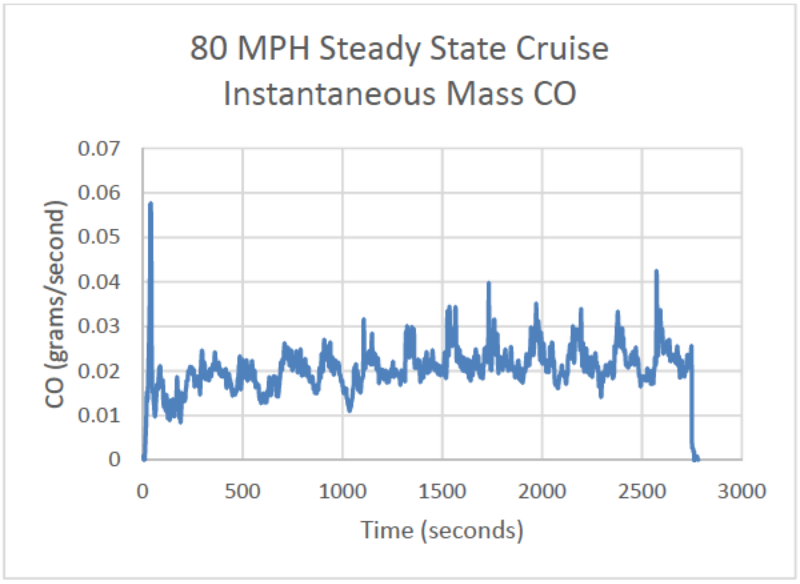


Figure 9.2.2: Vehicle 9 – 80 MPH Steady State Cruise Instantaneous Mass CO

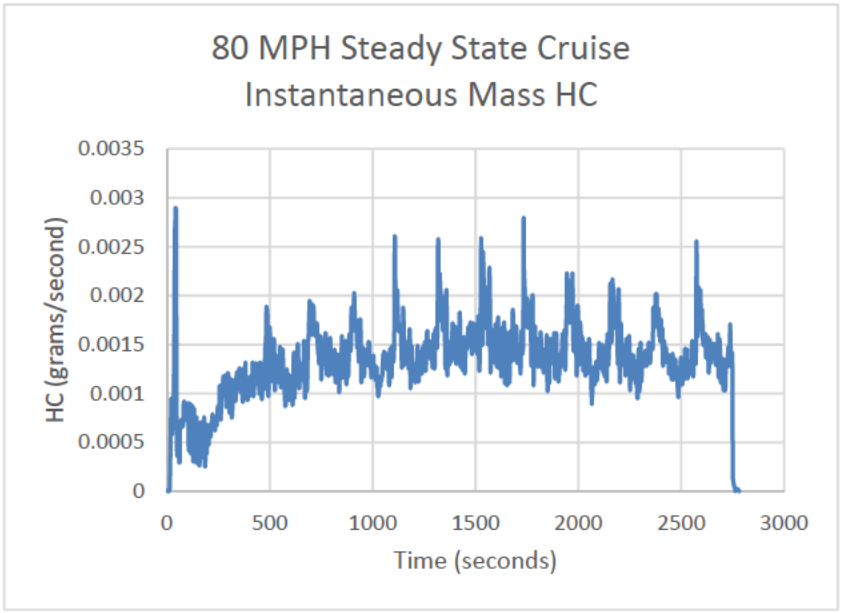


Figure 9.2.3: Vehicle 9 – 80 MPH Steady State Cruise Instantaneous Mass HC

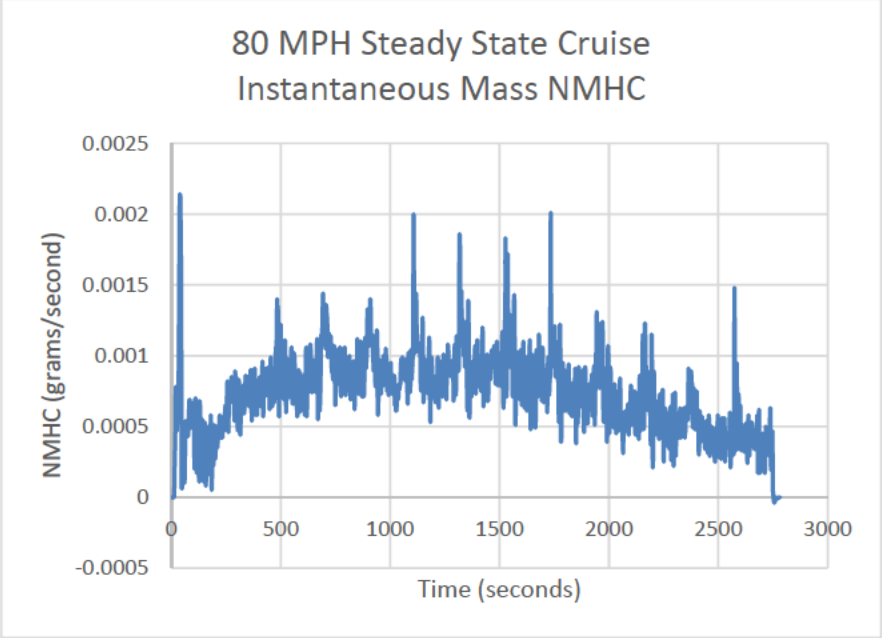


Figure 9.2.4: Vehicle 9 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

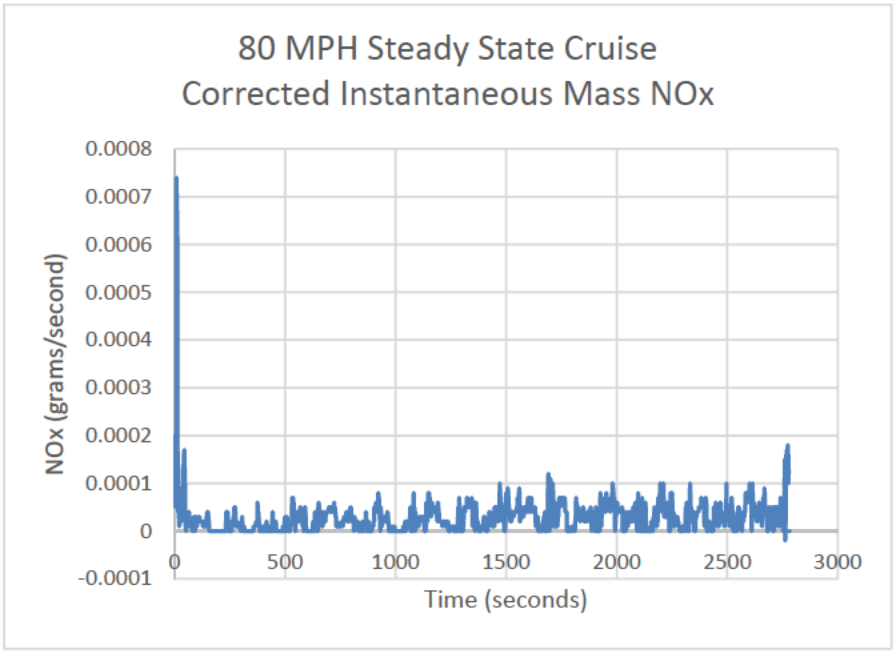


Figure 9.2.5: Vehicle 9 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

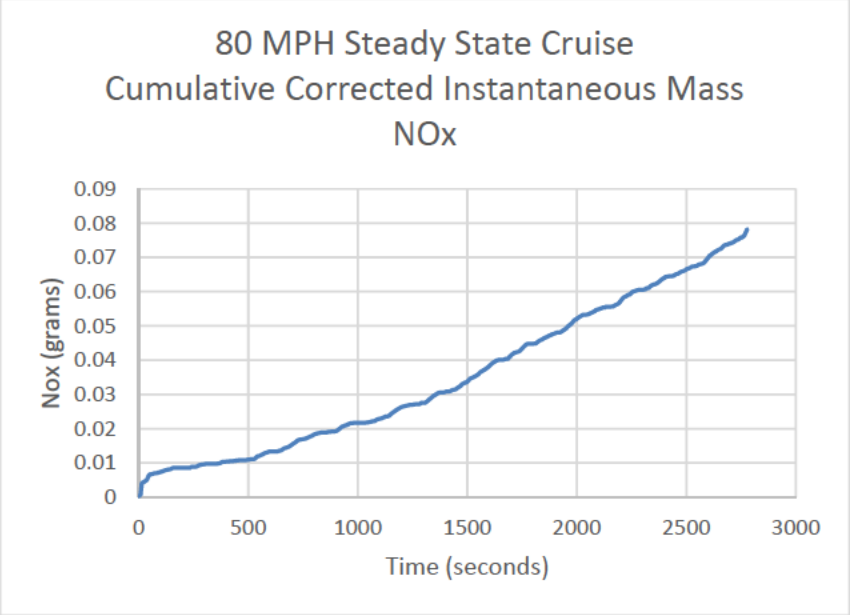


Figure 9.2.6: Vehicle 9 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

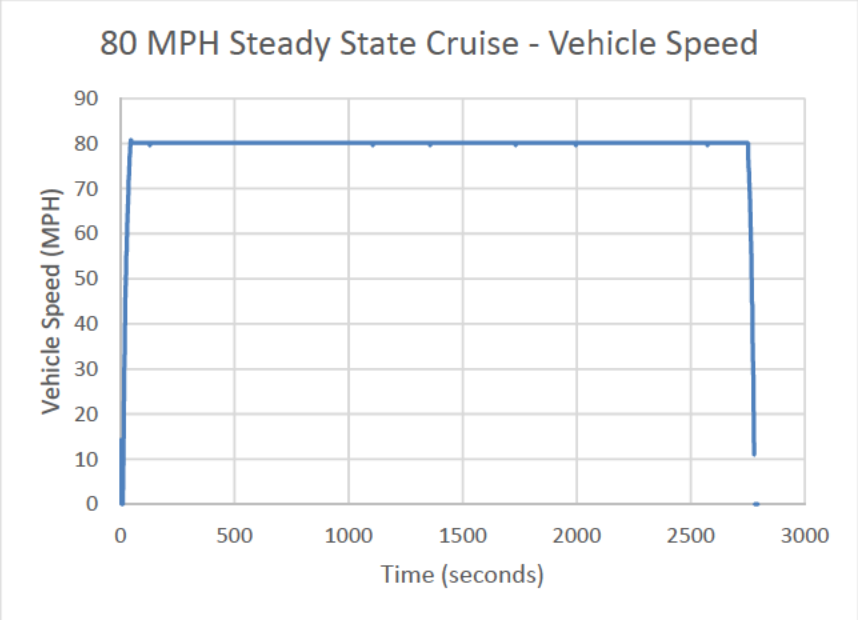


Figure 9.2.7: Vehicle 9 – 80 MPH Steady State Cruise Vehicle Speed

iii. Transient Cycle PEMS Test

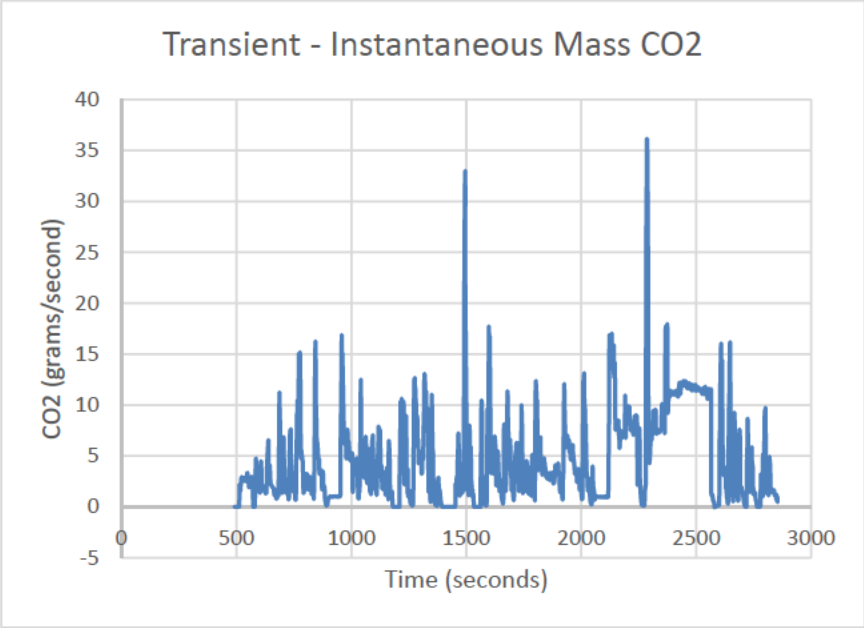


Figure 9.3.1: Vehicle 9 – Transient Cycle Instantaneous Mass CO_2

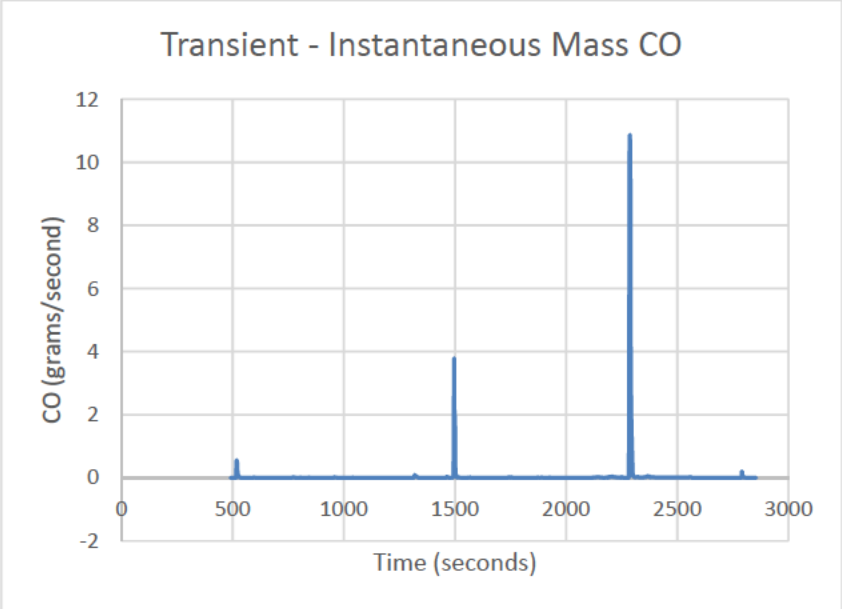


Figure 9.3.2: Vehicle 9 – Transient Cycle Instantaneous Mass CO

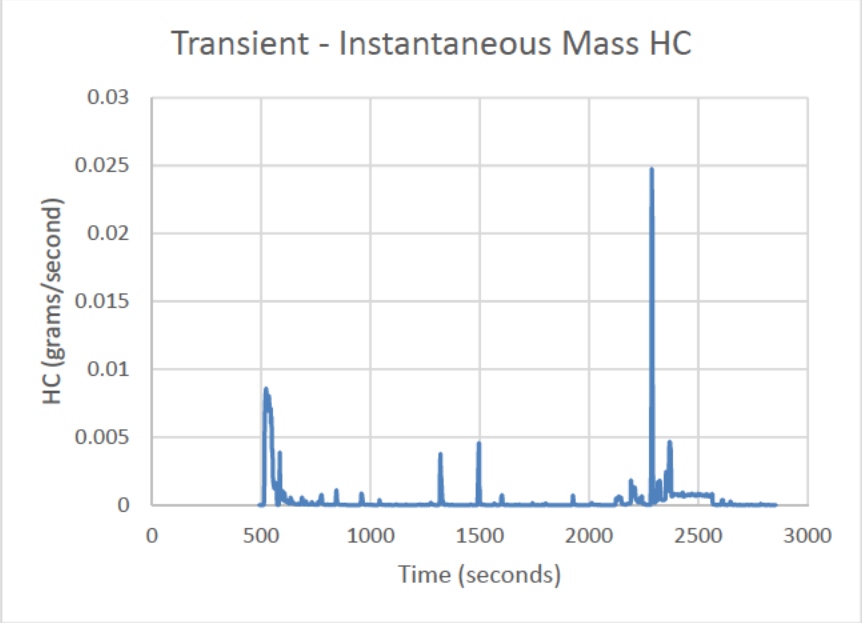


Figure 9.3.3: Vehicle 9 – Transient Cycle Instantaneous Mass HC

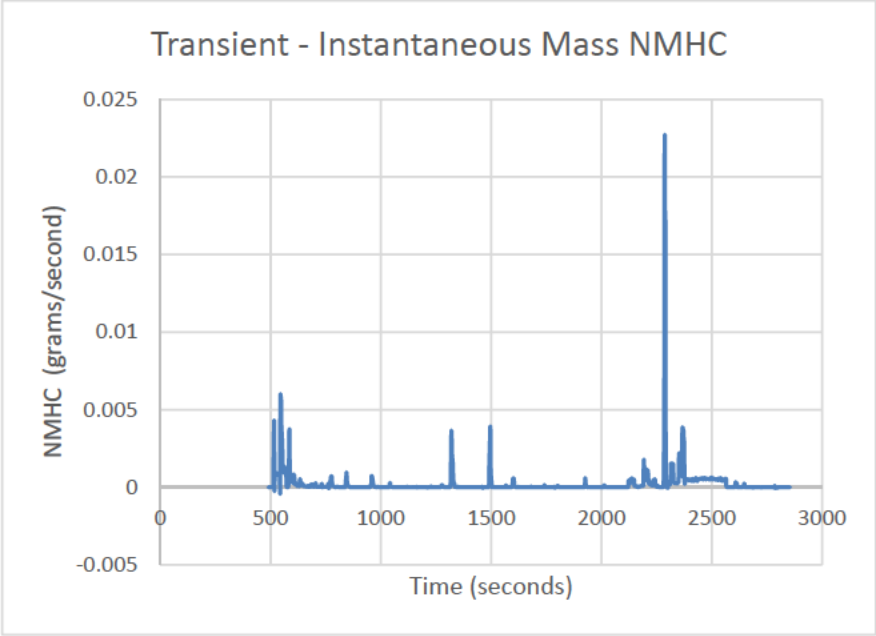


Figure 9.3.4: Vehicle 9 – Transient Cycle Instantaneous Mass NMHC

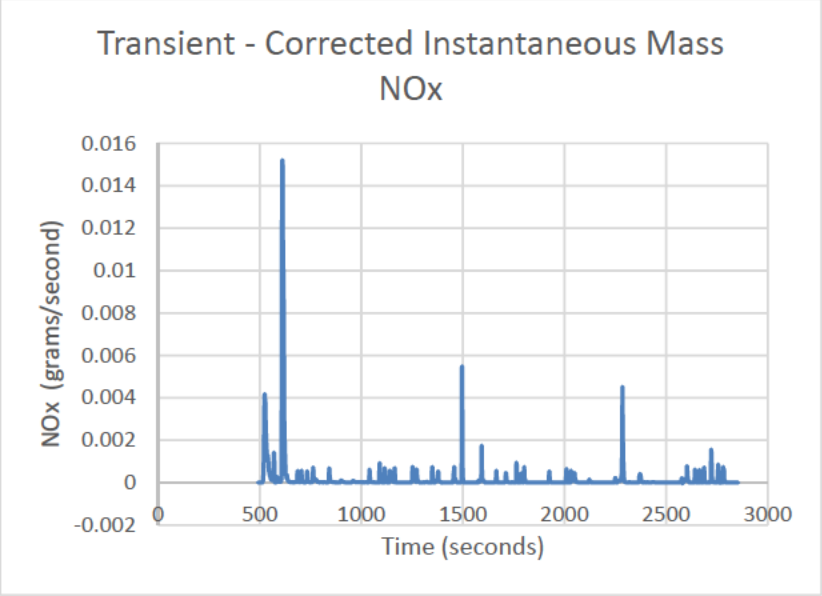


Figure 9.3.5: Vehicle 9 – Transient Cycle Instantaneous Mass NOx

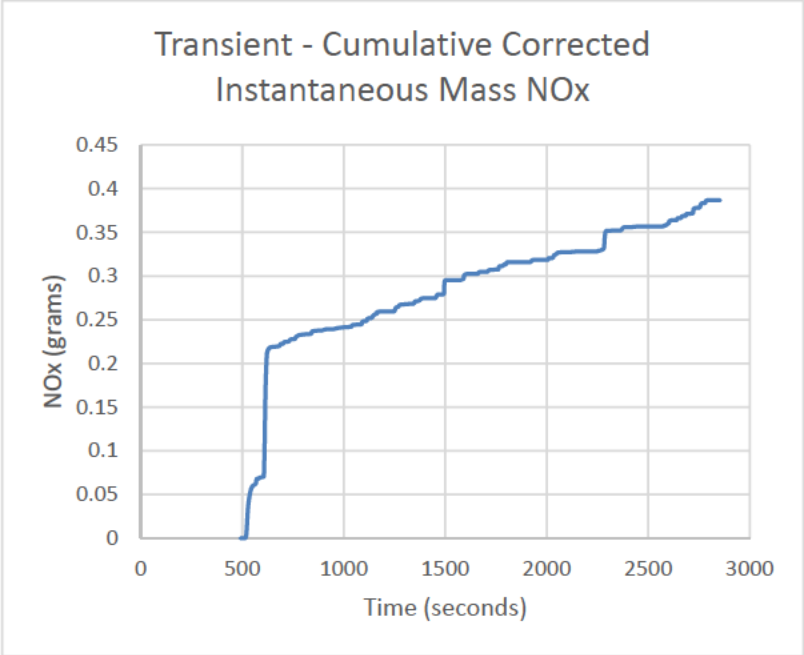


Figure 9.3.6: Vehicle 9 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

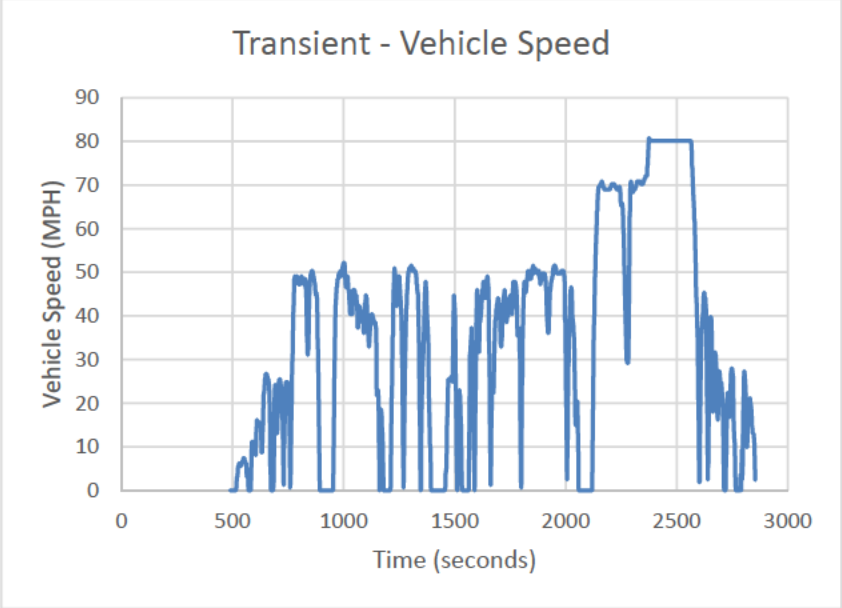


Figure 9.3.7: Vehicle 9 – Transient Cycle Vehicle Speed

10. Vehicle 10 - KCRXT03.65PA - V9DS61273 Ram 3.6L 8-speed Automatic 2WD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0011	270.0055	0.0039	0.0000	0.0000
50	0.0016	283.8614	0.0116	-0.0001	0.0006
60	0.0077	327.6495	0.0355	0.0033	0.0060
65	0.0090	339.1264	0.0393	0.0082	0.0164
70	0.0044	385.1315	0.1882	0.0123	0.0373
65	0.0018	335.1829	0.0863	0.0036	0.0169
75	0.0047	455.9996	0.2766	0.0074	0.0322
80	0.0026	506.2002	0.4890	0.0045	0.0263
85	0.0015	566.7697	0.4714	0.0037	0.0219

Table 10.1: Vehicle 10 – Steady State
File: V9DS61273_SSPEMS010519120580

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0219	518.9946	0.2711	0.0112	0.0195

Table 10.2: Vehicle 10 – 80 MPH Steady State Cruise
File: V9DS61273_80SS45010419120580

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0078	467.0167	2.3069	0.0155	0.0249

Table 10.3: Vehicle 10 – Transient Cycle
File: V9DS61273_P-IUVP010419120580

b. Summary Plots

i. Steady State PEMS Test

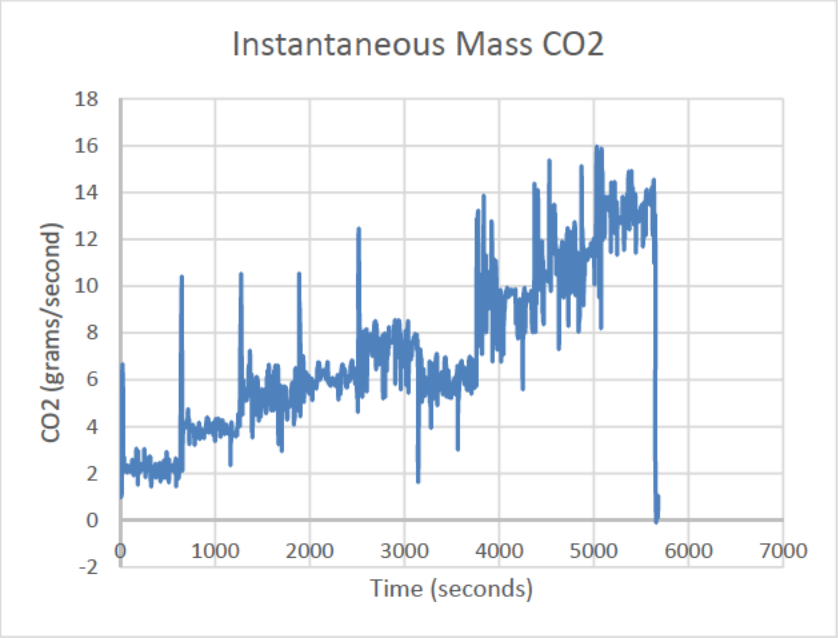


Figure 10.1.1: Vehicle 10 – Steady State Instantaneous Mass CO_2

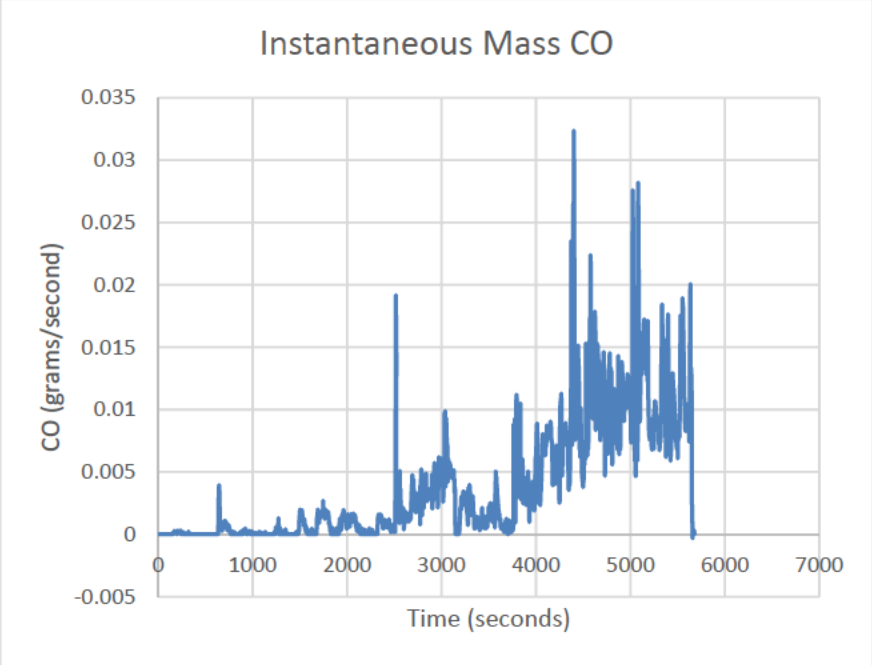


Figure 10.1.2: Vehicle 10 – Steady State Instantaneous Mass CO

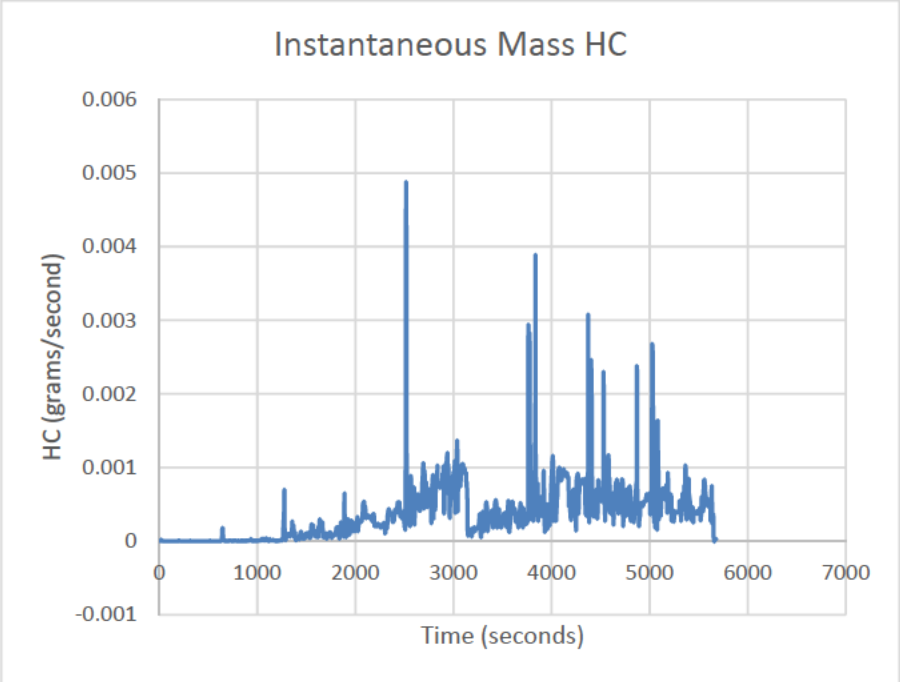


Figure 10.1.3: Vehicle 10 – Steady State Instantaneous Mass HC

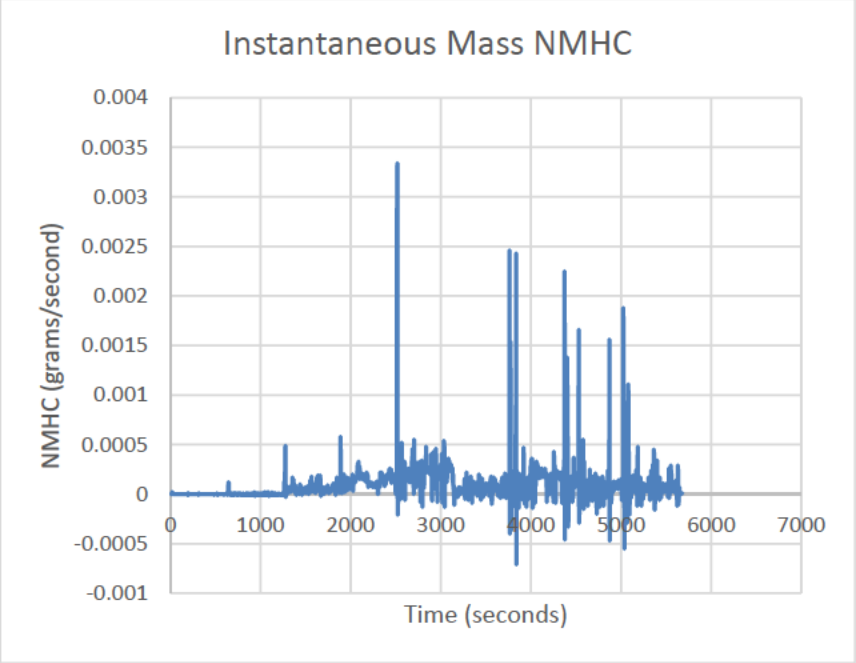


Figure 10.1.4: Vehicle 10 – Steady State Instantaneous Mass NMHC

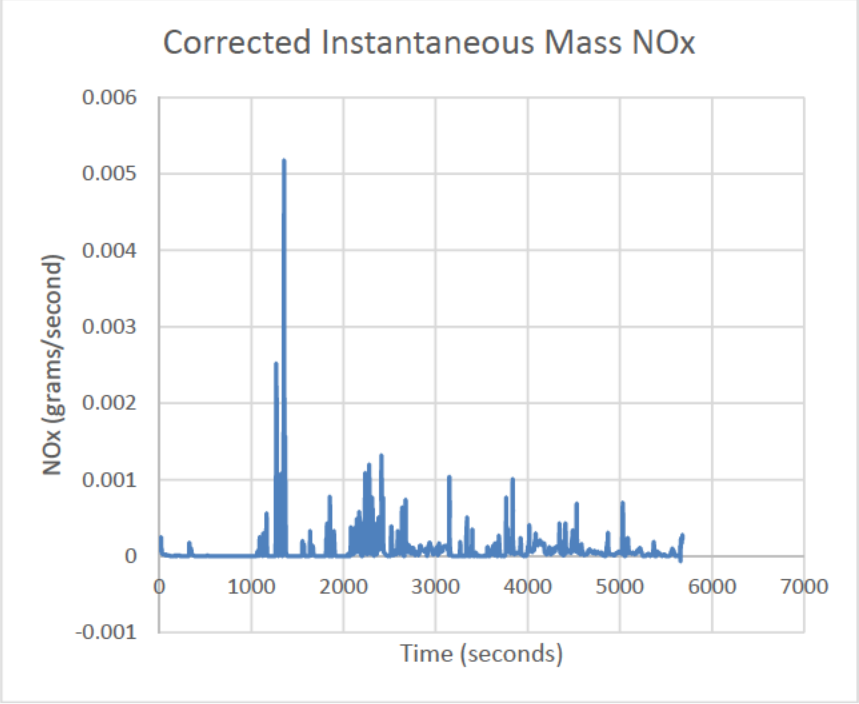


Figure 10.1.5: Vehicle 10 – Steady State Corrected Instantaneous Mass NOx

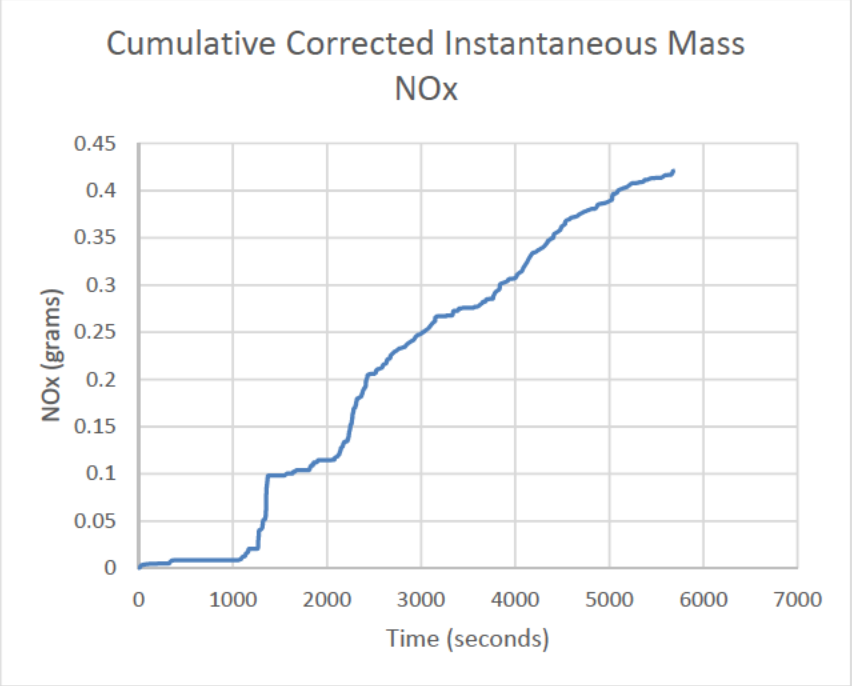


Figure 10.1.6: Vehicle 10 – Steady State Cumulative Corrected Instantaneous Mass NOx

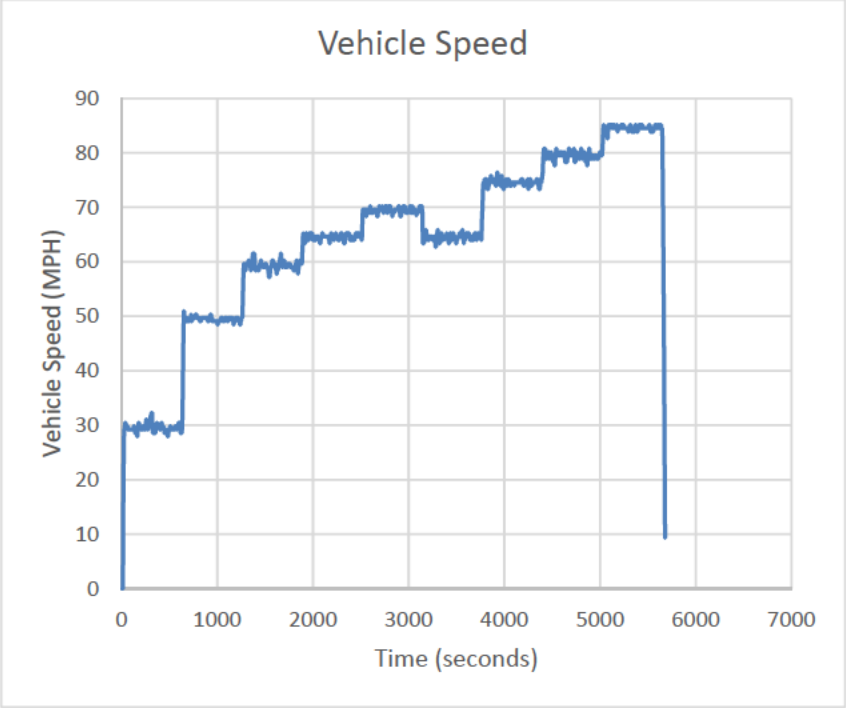


Figure 10.1.7: Vehicle 10 – Steady State Vehicle Speed

ii. 80 MPH Steady State Cruise PEMS Test

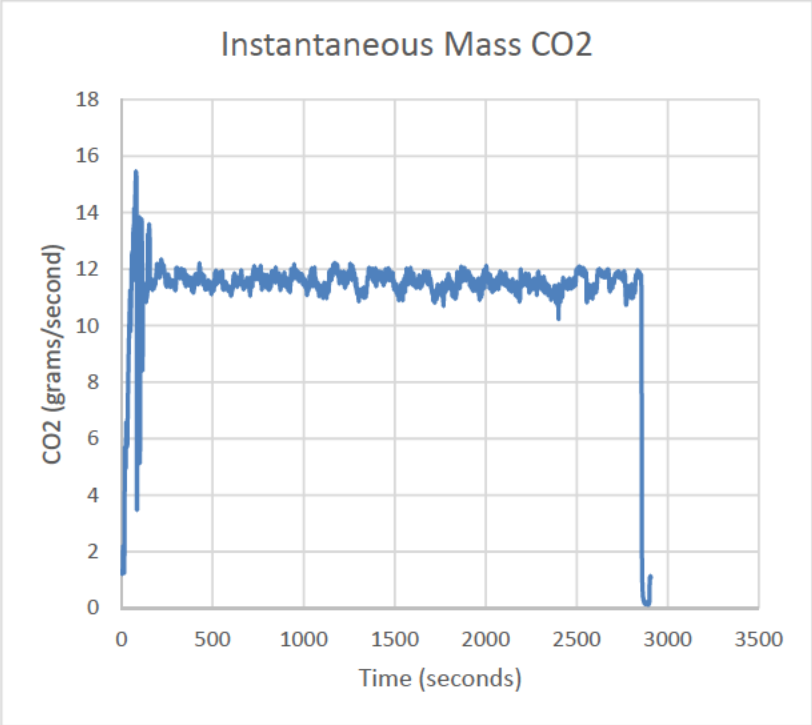


Figure 10.2.1: Vehicle 10 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

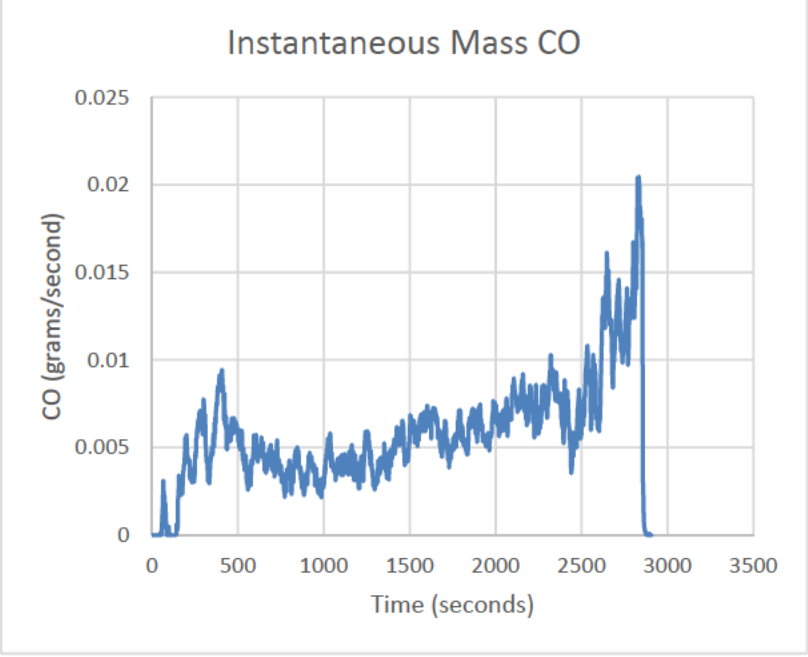


Figure 10.2.2: Vehicle 10 – 80 MPH Steady State Cruise Instantaneous Mass CO

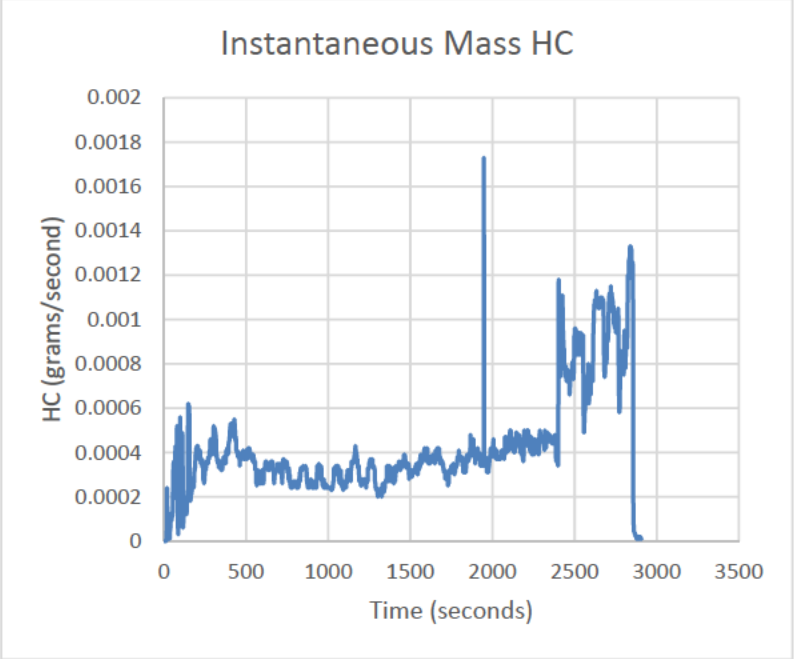


Figure 10.2.3: Vehicle 10 – 80 MPH Steady State Cruise Instantaneous Mass HC

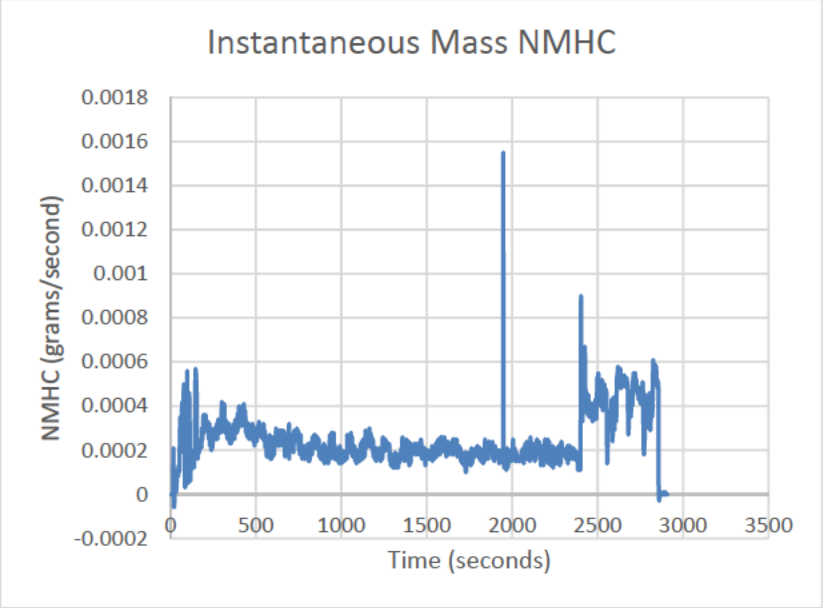


Figure 10.2.4: Vehicle 10 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

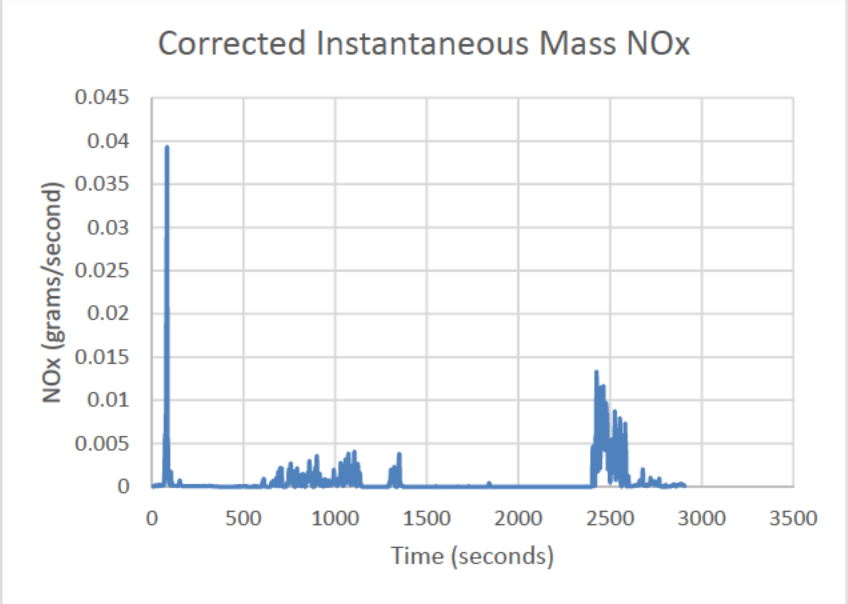


Figure 10.2.5: Vehicle 10 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

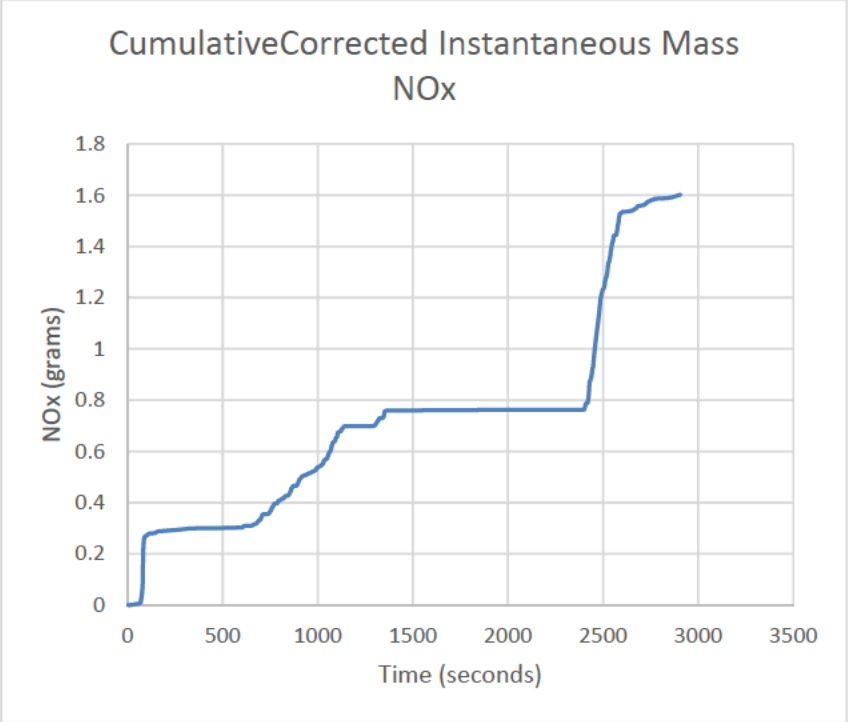


Figure 10.2.6: Vehicle 10 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

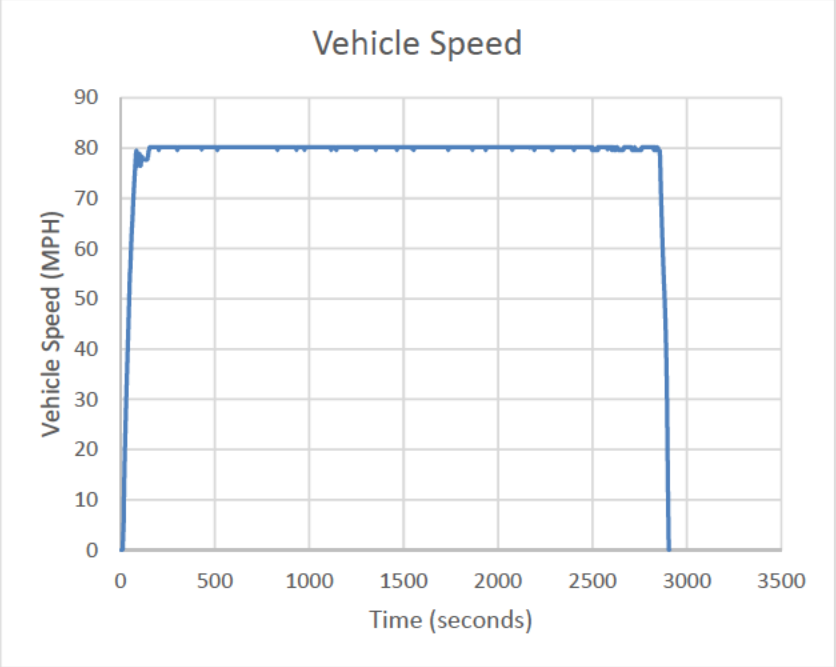


Figure 10.2.7: Vehicle 10 – 80 MPH Steady State Cruise Vehicle Speed

iii. Transient Cycle PEMS Test

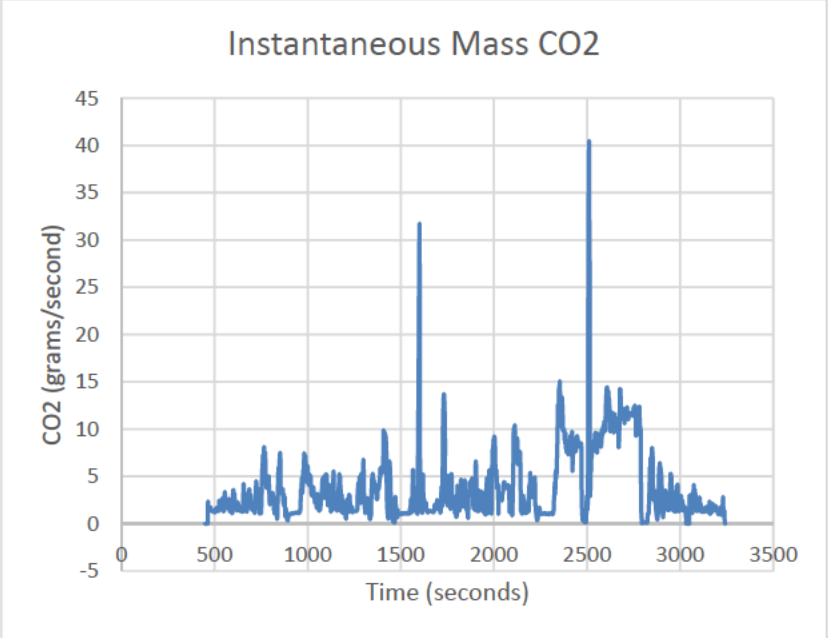


Figure 10.3.1: Vehicle 10 – Transient Cycle Instantaneous Mass CO_2

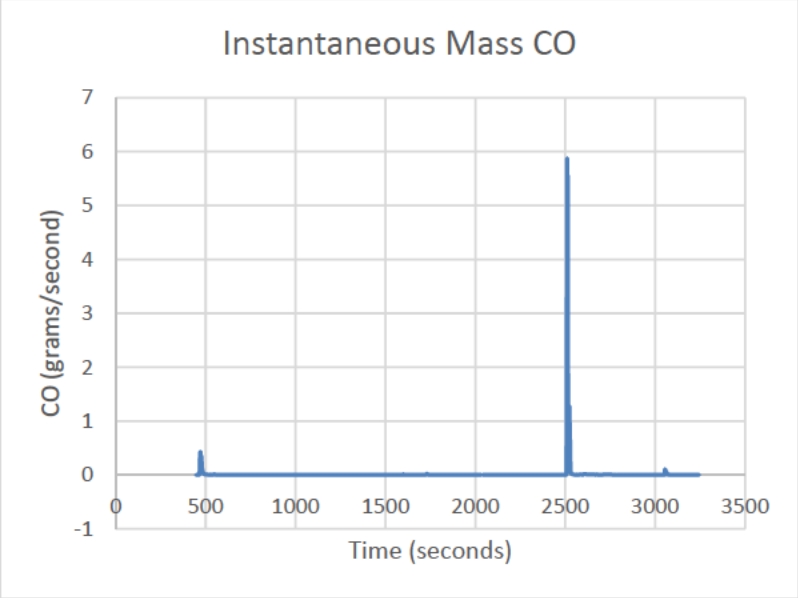


Figure 10.3.2: Vehicle 10 – Transient Cycle Instantaneous Mass CO

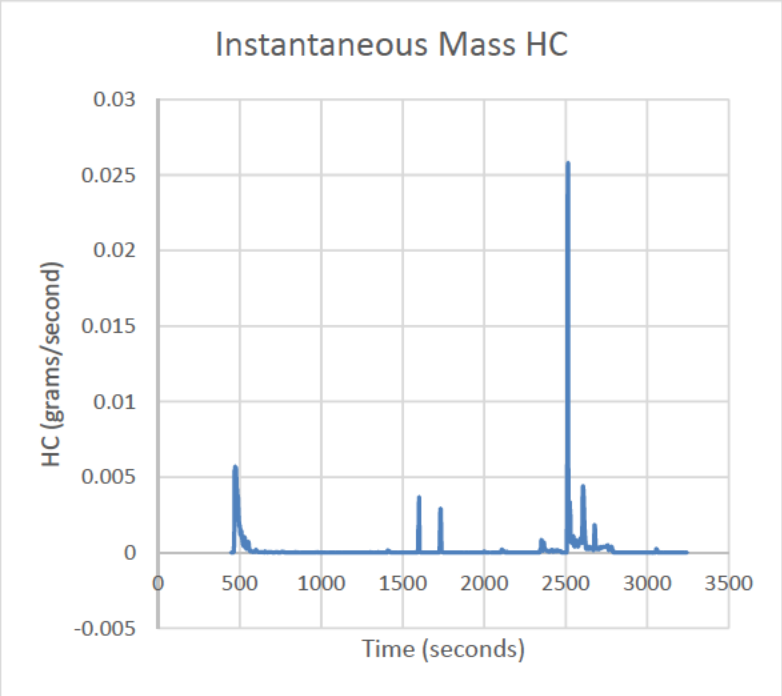


Figure 10.3.3: Vehicle 10 – Transient Cycle Instantaneous Mass HC

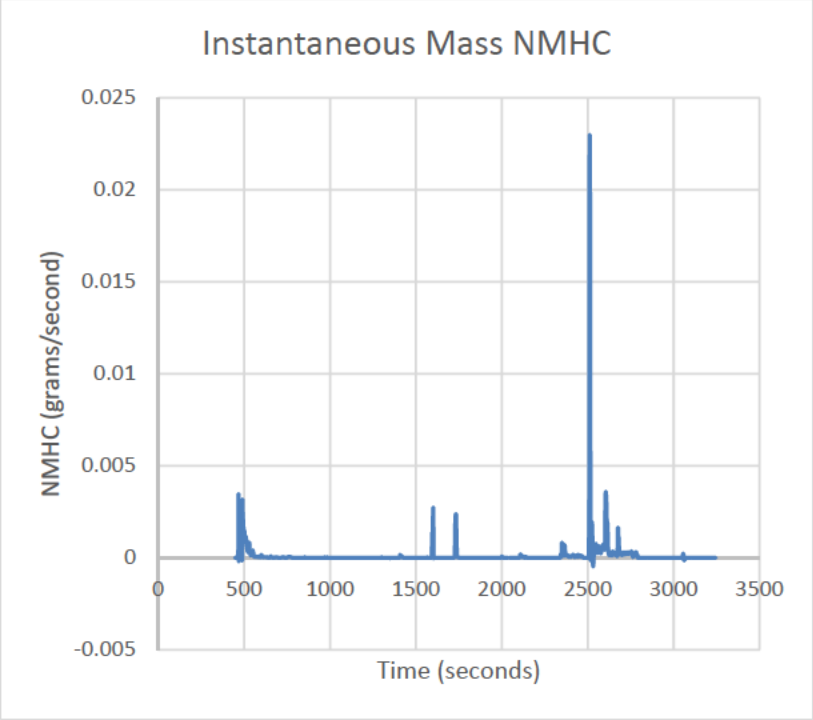


Figure 10.3.4: Vehicle 10 – Transient Cycle Instantaneous Mass NMHC

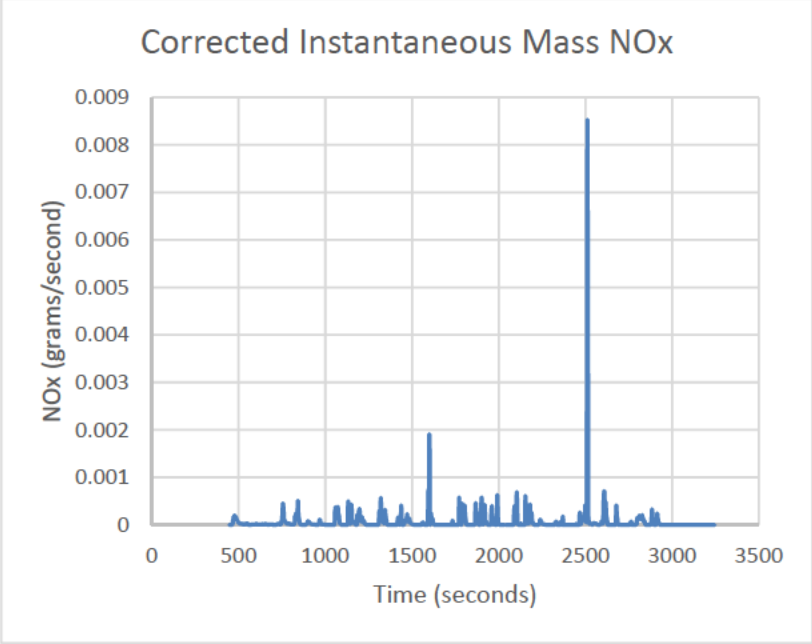


Figure 10.3.5: Vehicle 10 – Transient Cycle Instantaneous Mass NOx

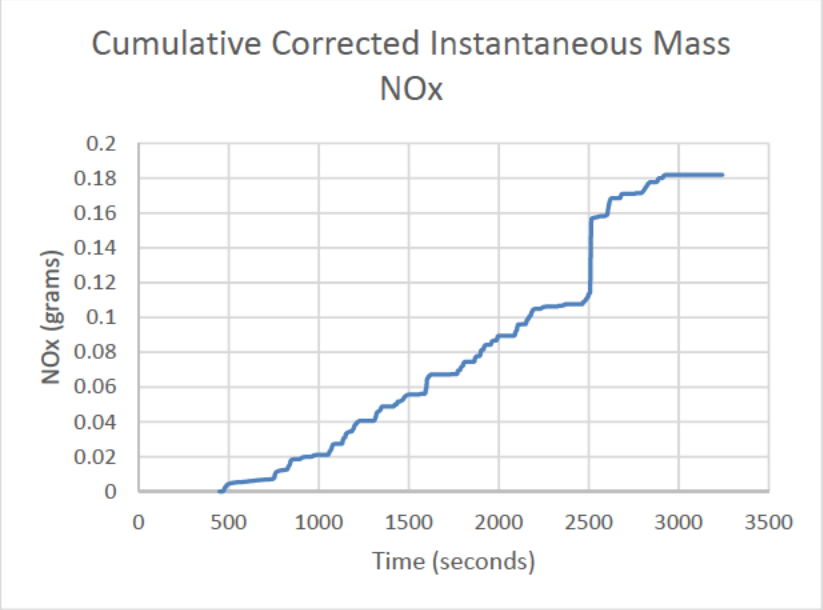


Figure 10.3.6: Vehicle 10 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

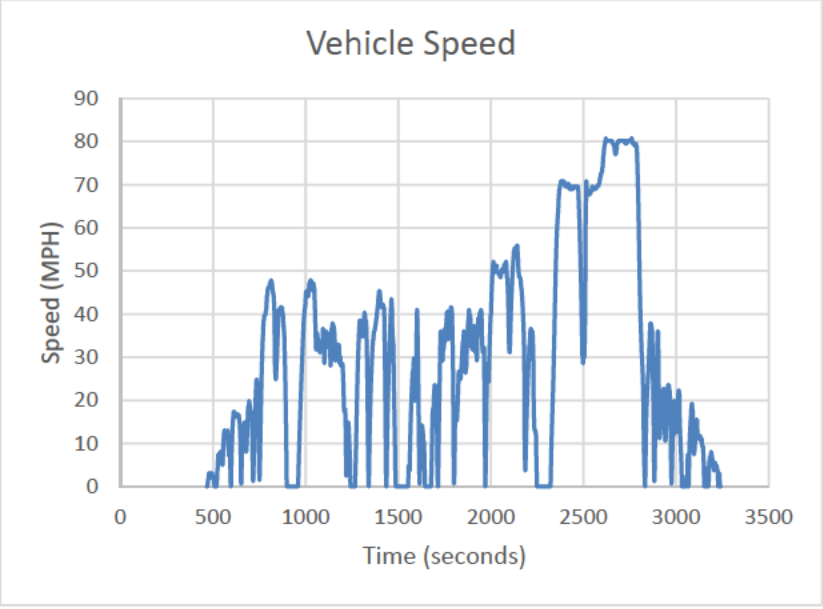


Figure 10.3.7: Vehicle 10 – Transient Cycle Vehicle Speed

11. Vehicle 11 - KCRXT05.75P0 - V9DT19726 Ram 5.7L 8-speed Automatic 2WD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0033	261.4010	0.3640	0.0000	0.0000
50	0.0000	304.0848	0.5495	-0.0001	0.0001
60	0.0010	368.1777	0.6477	0.0094	0.0132
65	0.0000	430.1580	1.0015	0.0042	0.0107
70	0.0000	456.4347	0.5901	0.0016	0.0070
65	0.0000	426.0902	0.5327	0.0004	0.0067
75	0.0000	489.9814	1.1122	0.0004	0.0119
80	0.0000	539.5504	1.2308	-0.0004	0.0099
85	0.0000	584.1524	1.1044	-0.0009	0.0083

Table 11.1: Vehicle 11 – Steady State
File: V9DT19726_SSPEMS010119110280 - Repeat

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0001	543.6086	1.0920	0.0047	0.0098

Table 11.2: Vehicle 11 – 80 MPH Steady State Cruise
File: V9DT19726_80SS45010119102780

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0207	535.9039	7.2621	0.0137	0.0277

Table 11.3: Vehicle 11 – Transient Cycle
File: V9DT19726_P-IUVP010219102780

b. Summary Plots

i. Steady State PEMS Test

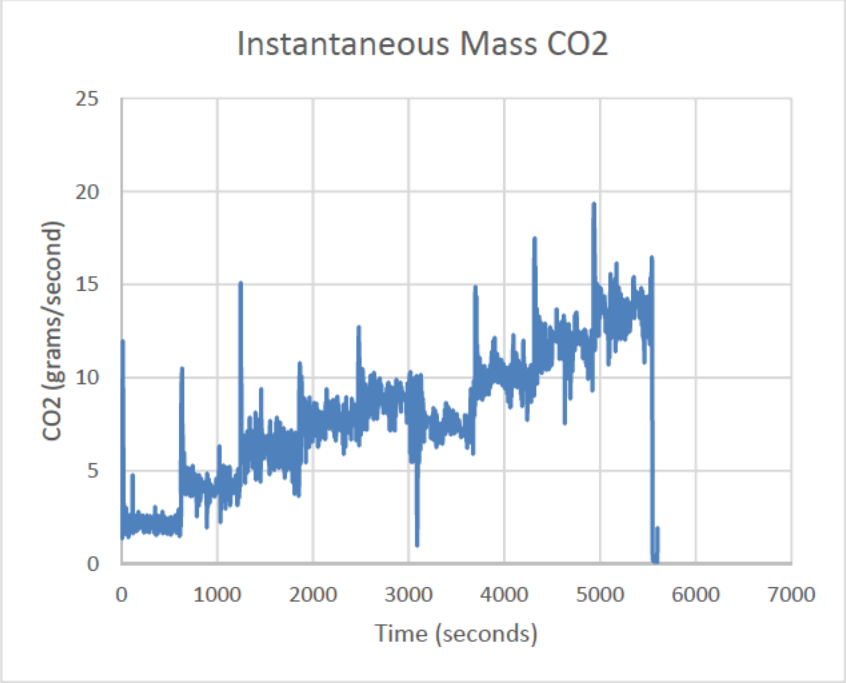


Figure 11.1.1: Vehicle 11 – Steady State Instantaneous Mass CO_2

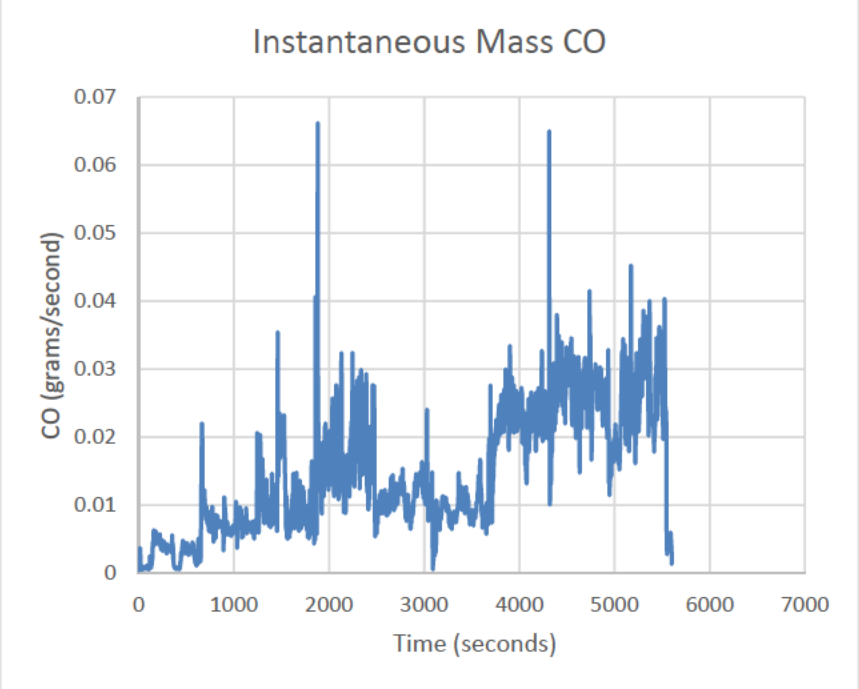


Figure 11.1.2: Vehicle 11 – Steady State Instantaneous Mass CO

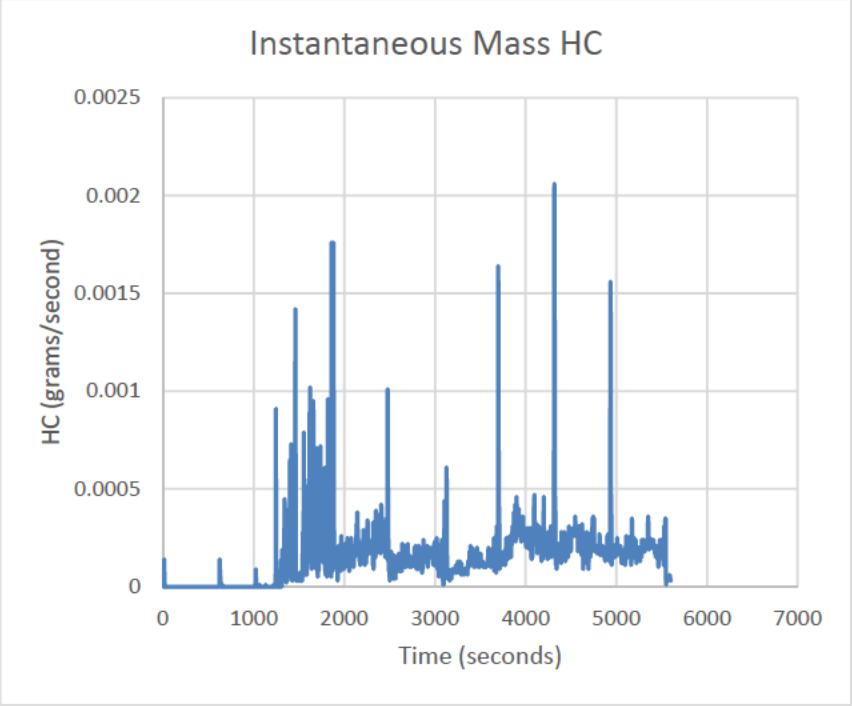


Figure 11.1.3: Vehicle 11 – Steady State Instantaneous Mass HC

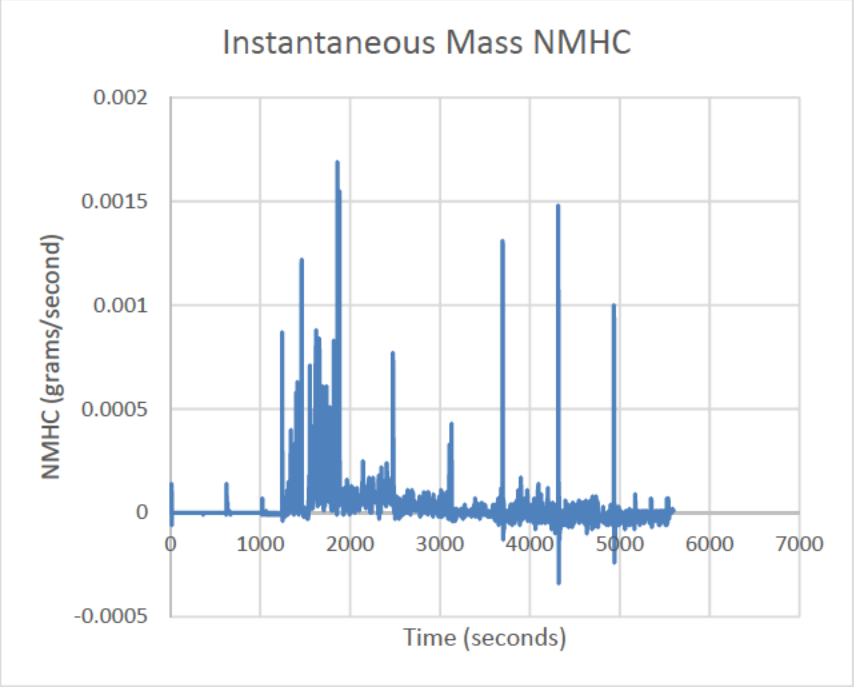


Figure 11.1.4: Vehicle 11 – Steady State Instantaneous Mass NMHC

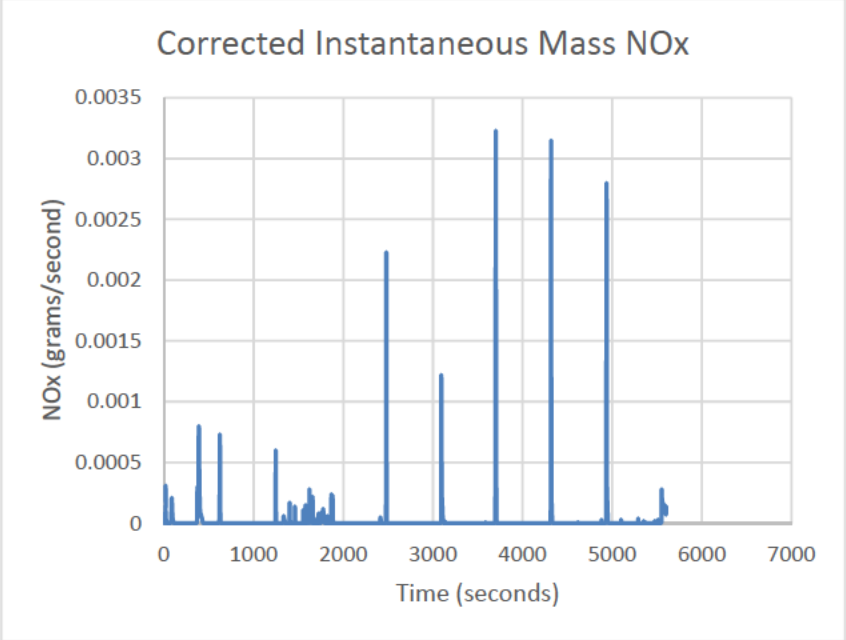


Figure 11.1.5: Vehicle 11 – Steady State Corrected Instantaneous Mass NOx

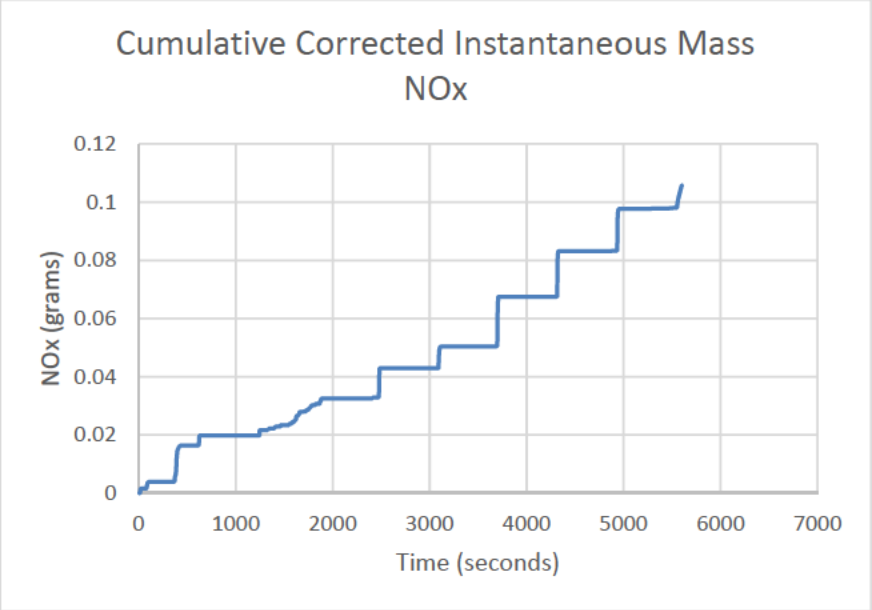


Figure 11.1.6: Vehicle 11 – Steady State Cumulative Corrected Instantaneous Mass NOx

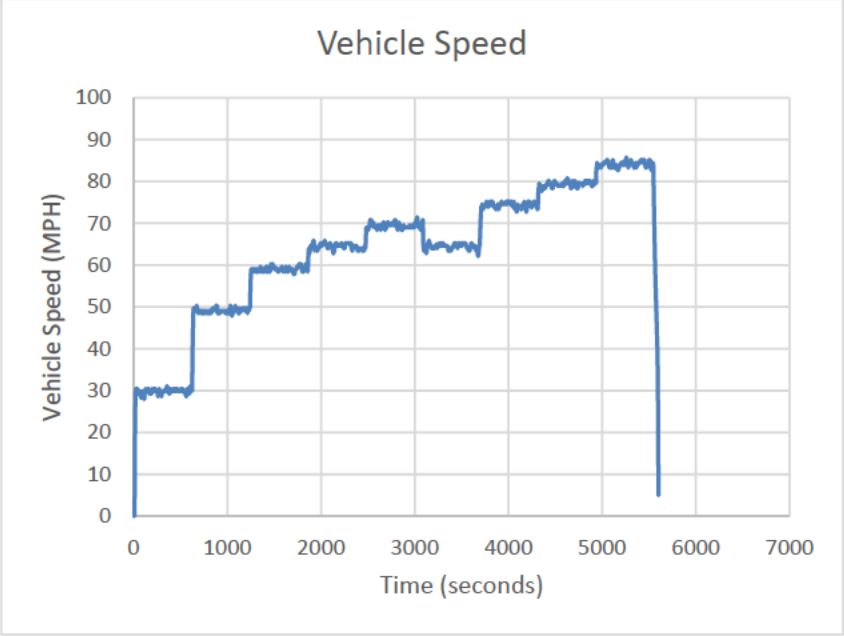


Figure 11.1.7: Vehicle 11 – Steady State Vehicle Speed

ii. 80 MPH Steady State Cruise PEMS Test

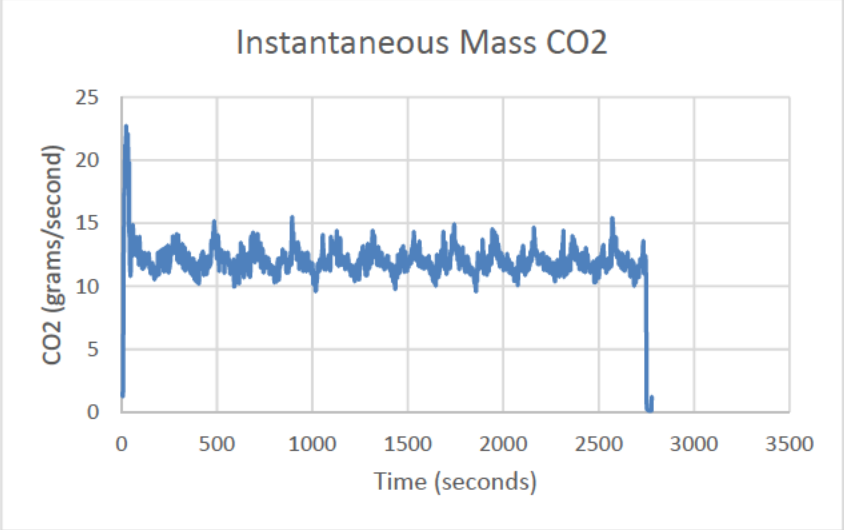


Figure 11.2.1: Vehicle 11 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

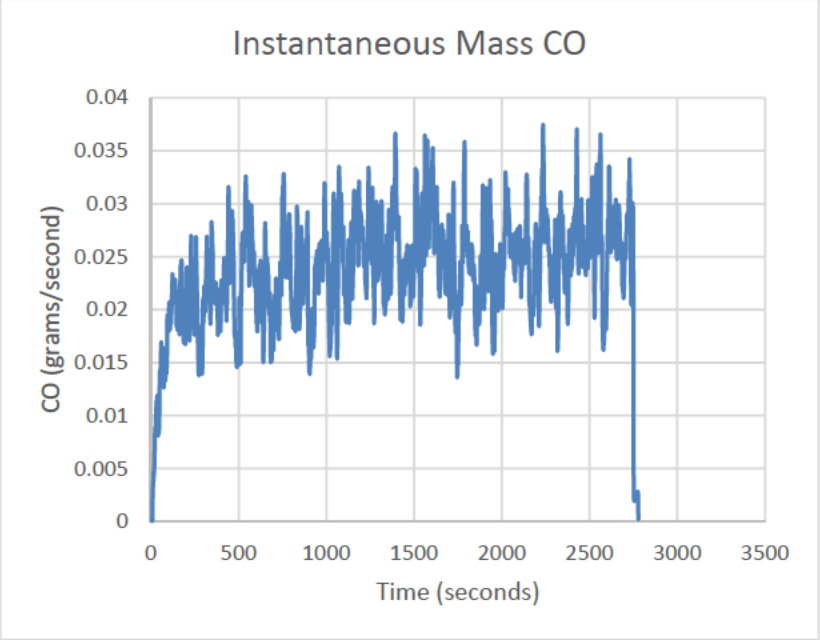


Figure 11.2.2: Vehicle 11 – 80 MPH Steady State Cruise Instantaneous Mass CO

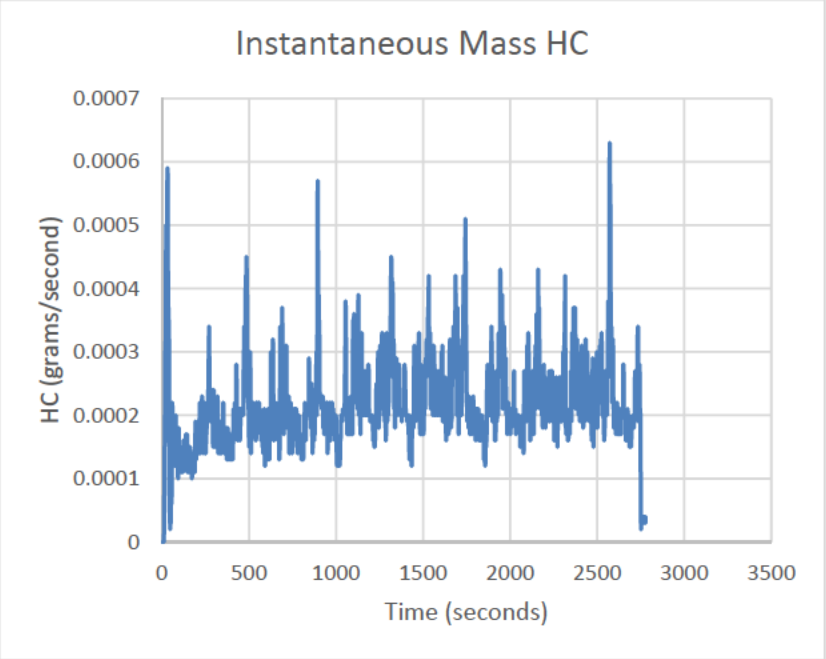


Figure 11.2.3: Vehicle 11 – 80 MPH Steady State Cruise Instantaneous Mass HC

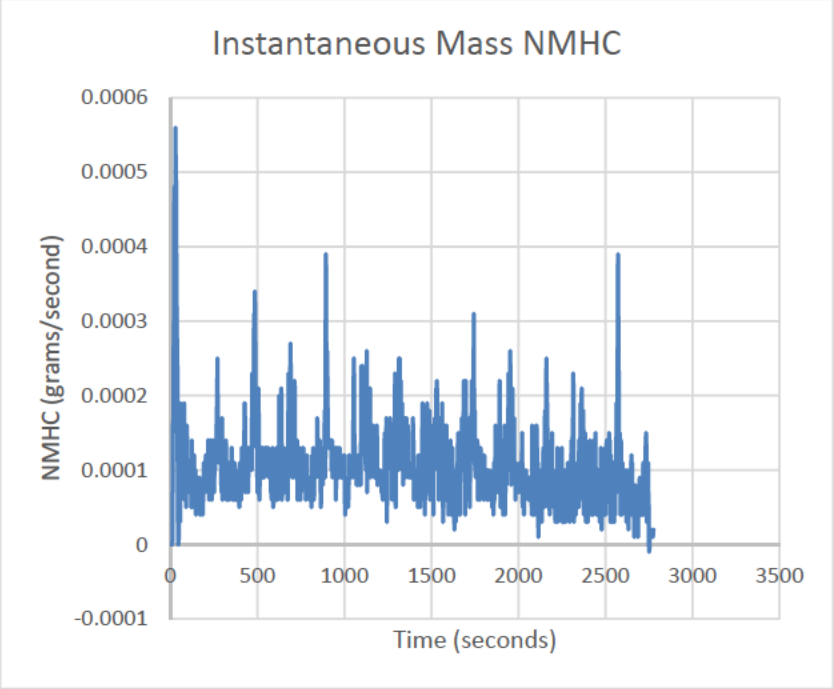


Figure 11.2.4: Vehicle 11 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

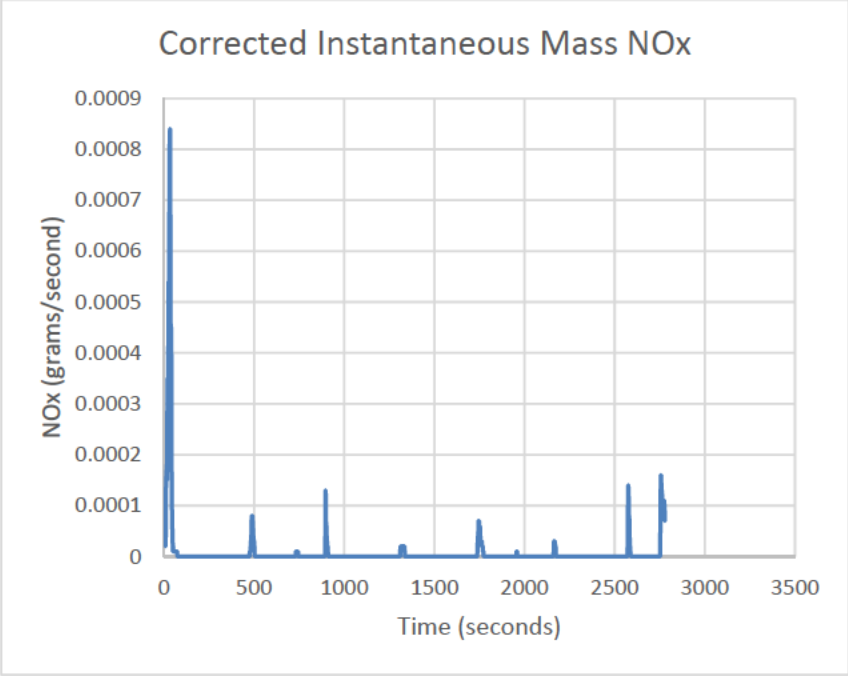


Figure 11.2.5: Vehicle 11 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

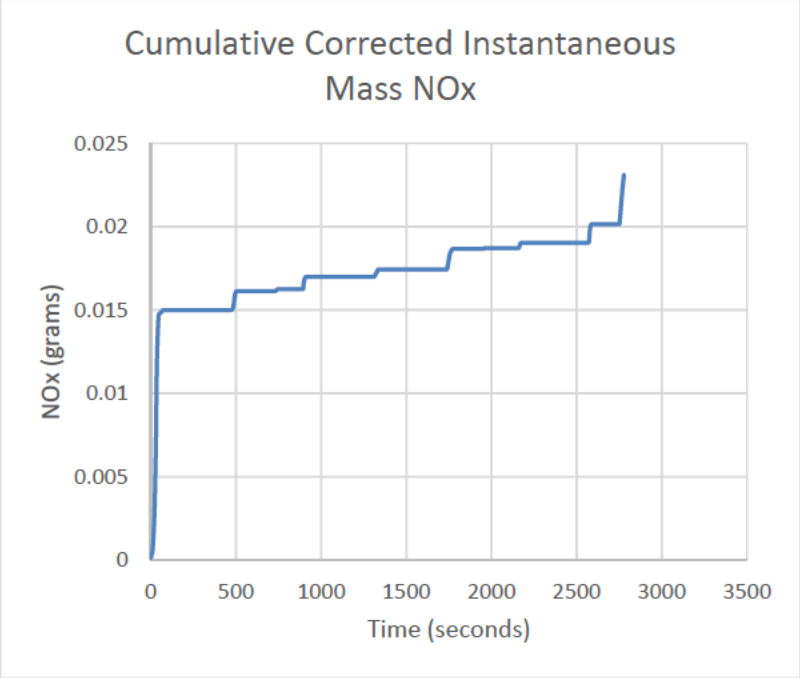


Figure 11.2.6: Vehicle 11 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

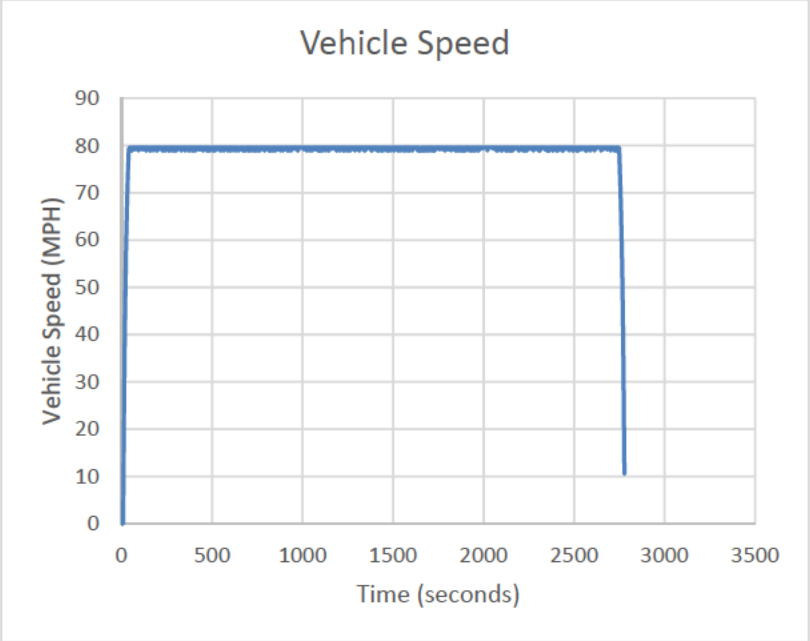


Figure 11.2.7: Vehicle 11 – 80 MPH Steady State Cruise Vehicle Speed

iii. Transient Cycle PEMS Test

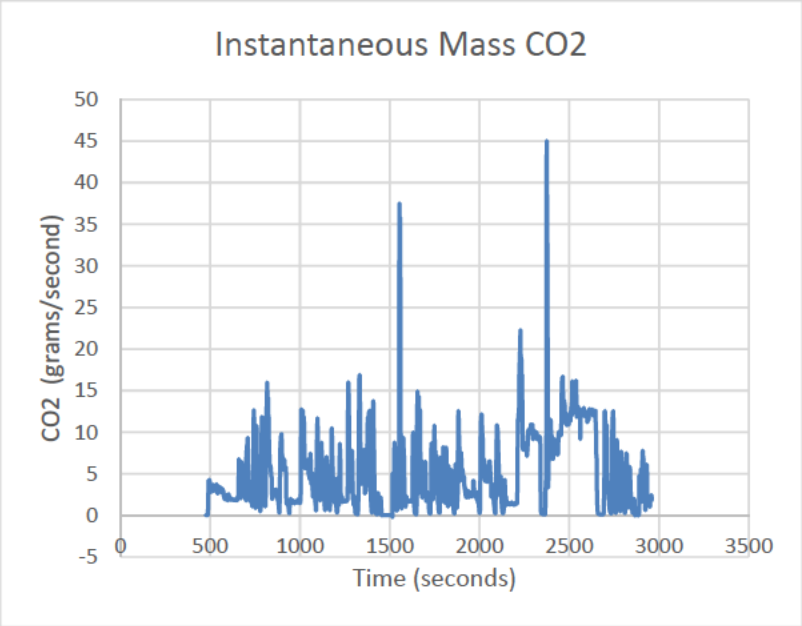


Figure 11.3.1: Vehicle 11 – Transient Cycle Instantaneous Mass CO_2

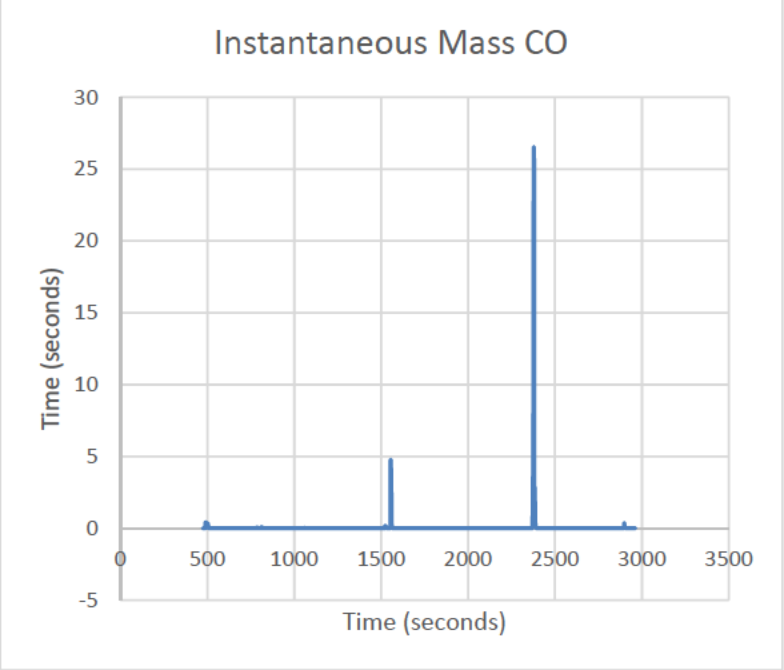


Figure 11.3.2: Vehicle 11 – Transient Cycle Instantaneous Mass CO

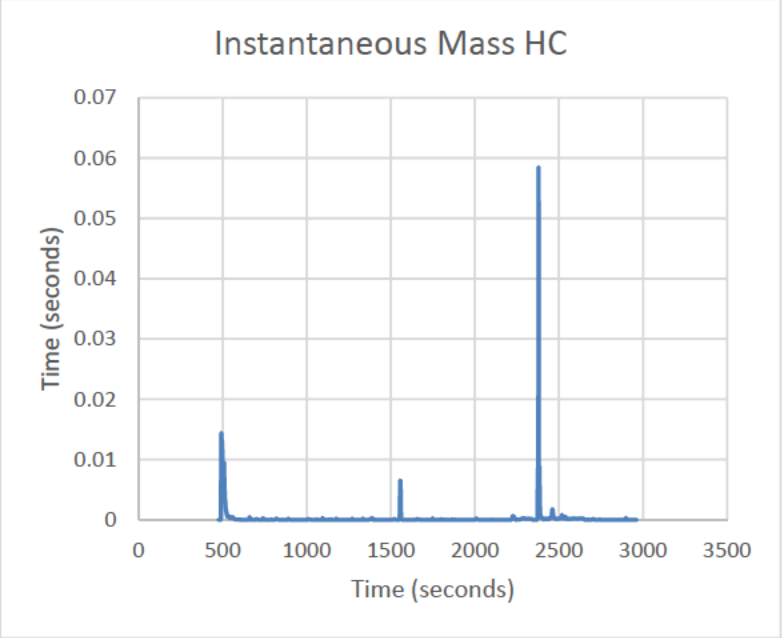


Figure 11.3.3: Vehicle 11 – Transient Cycle Instantaneous Mass HC

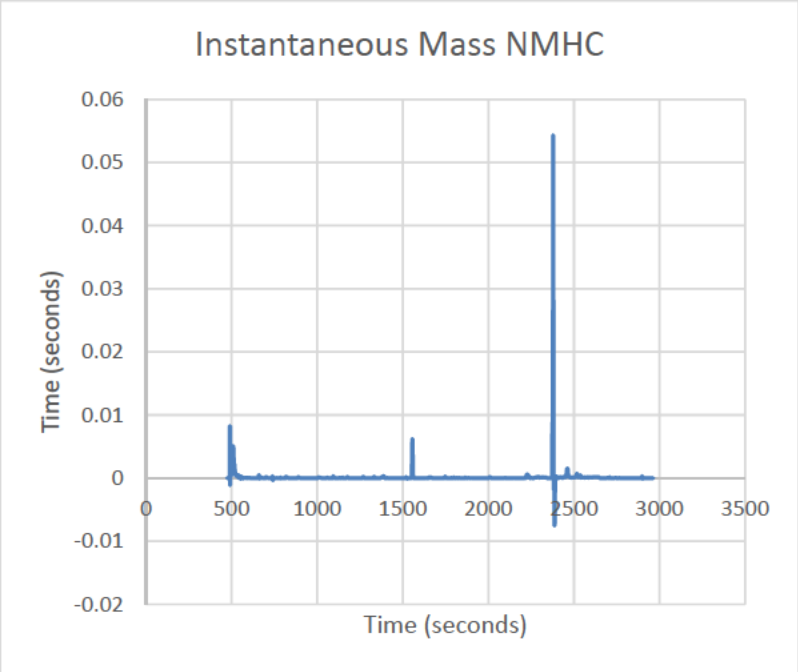


Figure 11.3.4: Vehicle 11 – Transient Cycle Instantaneous Mass NMHC

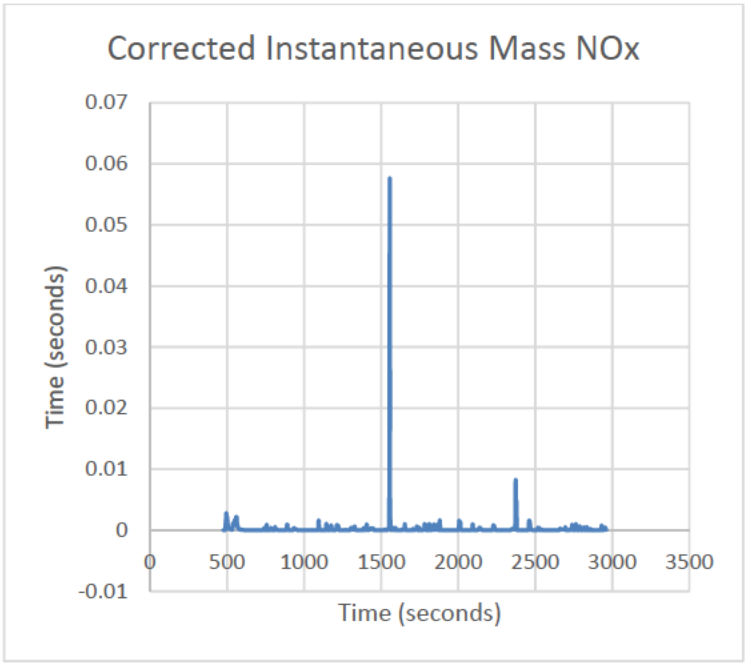


Figure 11.3.5: Vehicle 11 – Transient Cycle Instantaneous Mass NOx

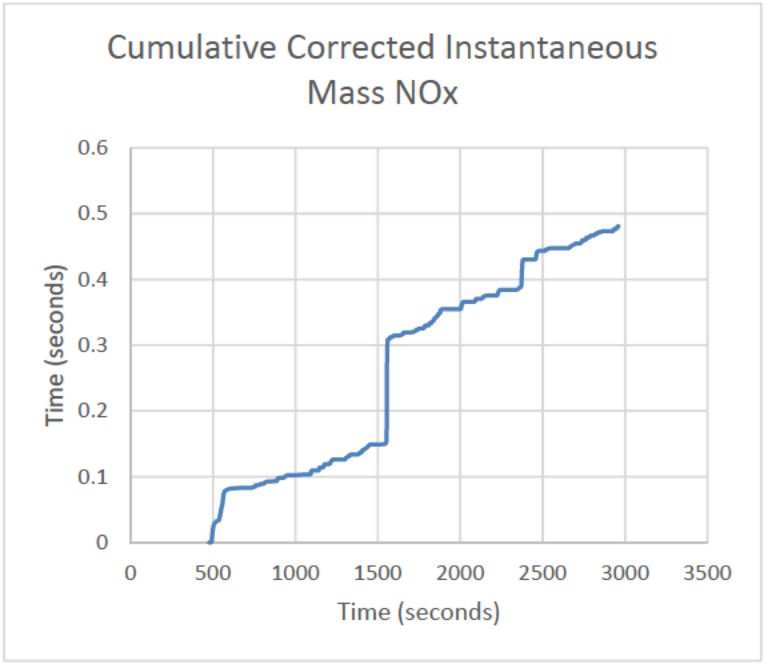


Figure 11.3.6: Vehicle 11 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

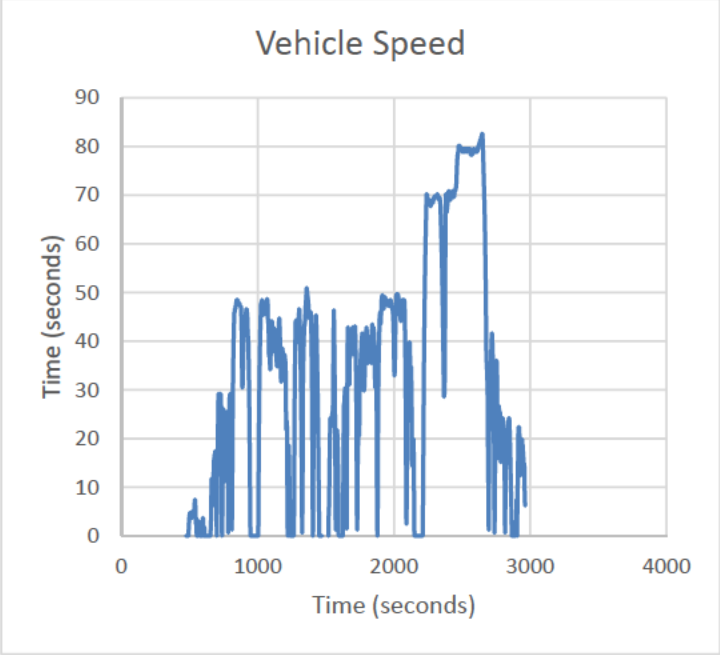


Figure 11.3.7: Vehicle 11 – Transient Cycle Vehicle Speed

12. Vehicle 12 - KCRXT05.75P1 - V9DT15415 Ram 5.7L BSG 8-speed Automatic 2WD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0001	257.3752	0.0811	0.0000	0.0000
50	0.0002	309.2737	0.2426	0.0000	0.0000
60	0.0011	381.5361	0.4101	0.0019	0.0033
65	0.0000	409.3036	0.3279	0.0003	0.0029
70	0.0003	452.0989	0.6617	0.0058	0.0152
65	0.0000	406.7538	0.2707	-0.0008	0.0035
75	0.0008	486.3788	0.7485	0.0011	0.0123
80	0.0042	527.8252	0.6131	-0.0008	0.0070
85	0.0033	580.2240	0.8594	-0.0007	0.0093

Table 12.1: Vehicle 12 – Steady State
File: V9DT15415_SSPEMS010319110380

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0018	549.8627	0.9362	0.0024	0.0072

Table 12.2: Vehicle 12 – 80 MPH Steady State Cruise
File: V9DT15415_80SS45010219110380

Trasient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0240	555.3614	3.0567	0.0094	0.0185

Table 12.3: Vehicle 12 – Transient Cycle
File: V9DT15415_P-IUVP010119110380

b. Summary Plots

i. Steady State PEMS Test

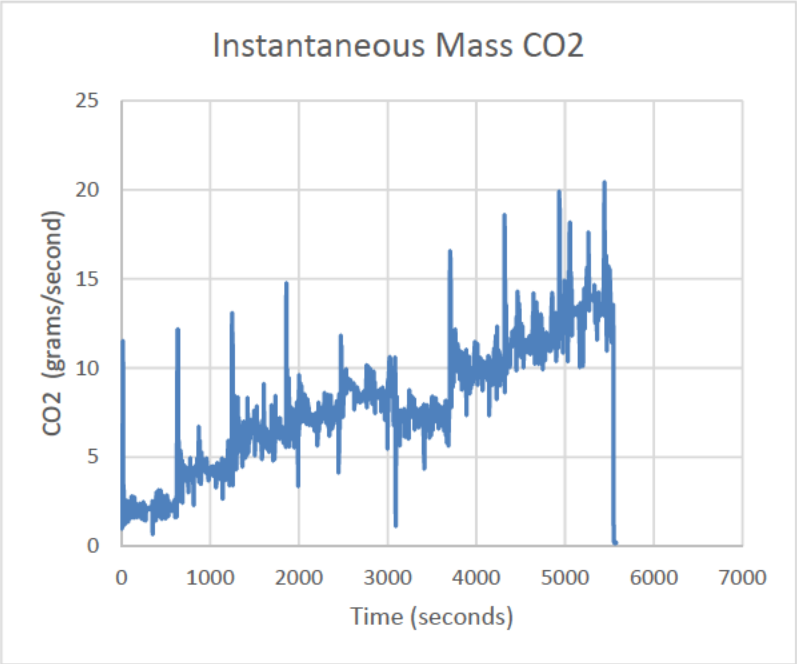


Figure 12.1.1: Vehicle 12 – Steady State Instantaneous Mass CO_2

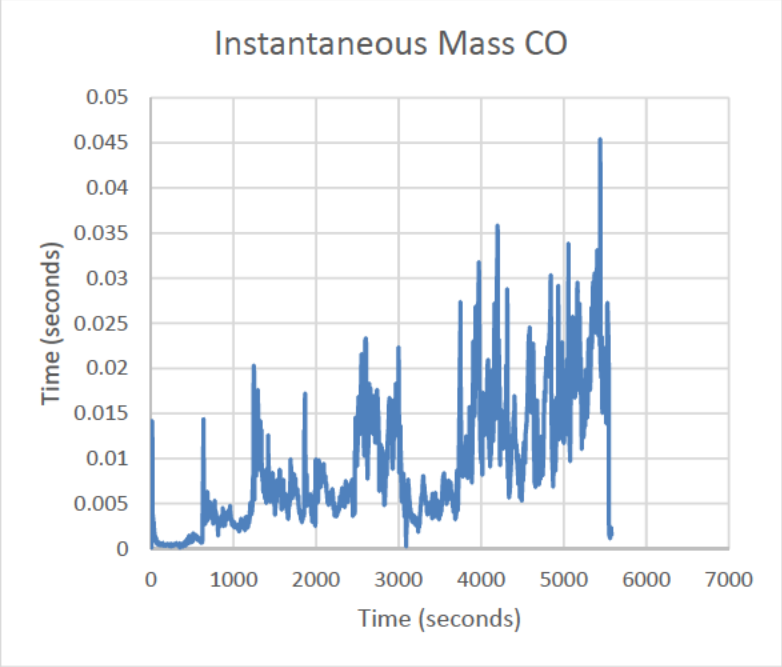


Figure 12.1.2: Vehicle 12 – Steady State Instantaneous Mass CO

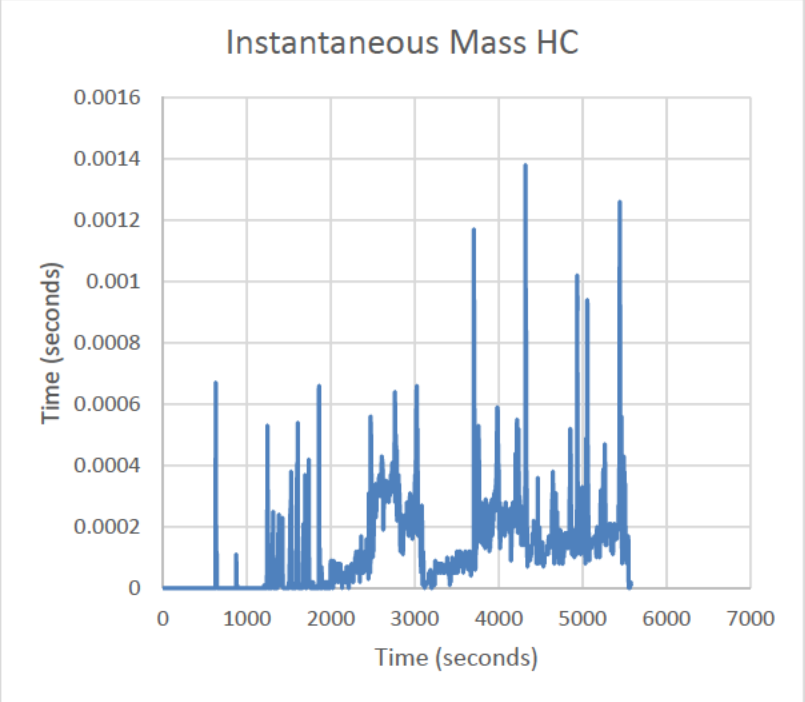


Figure 12.1.3: Vehicle 12 – Steady State Instantaneous Mass HC

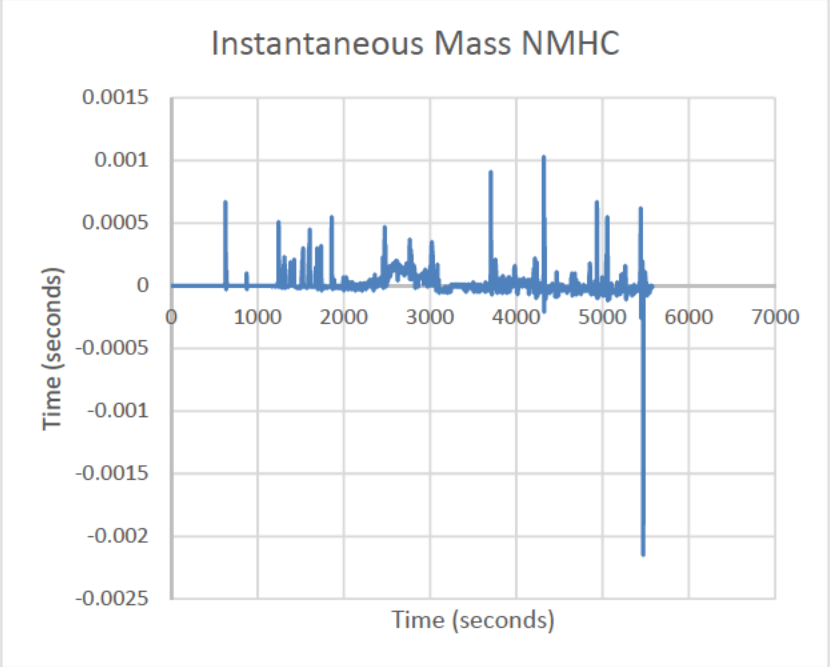


Figure 12.1.4: Vehicle 12 – Steady State Instantaneous Mass NMHC

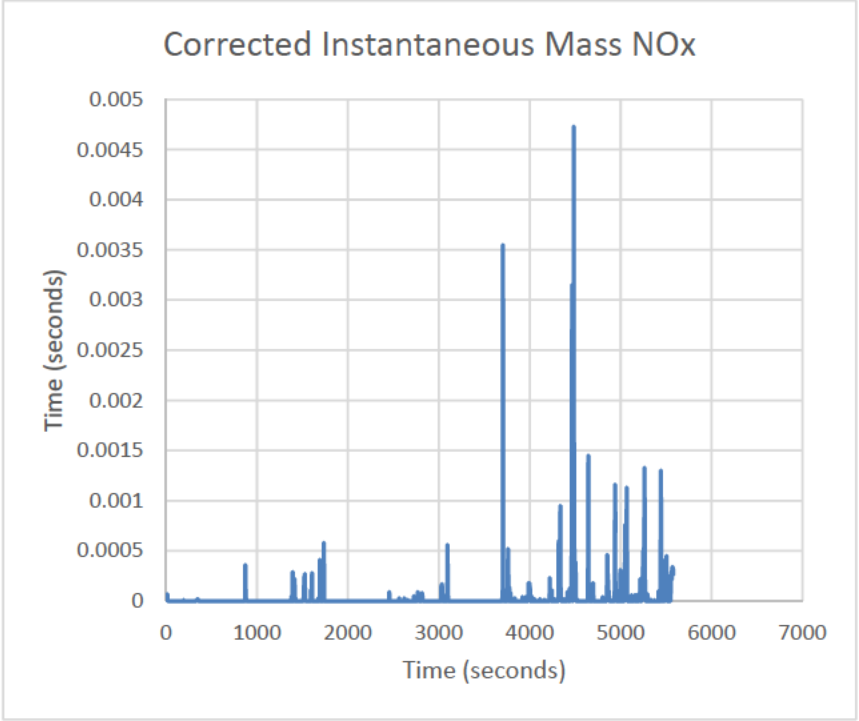


Figure 12.1.5: Vehicle 12 – Steady State Corrected Instantaneous Mass NOx

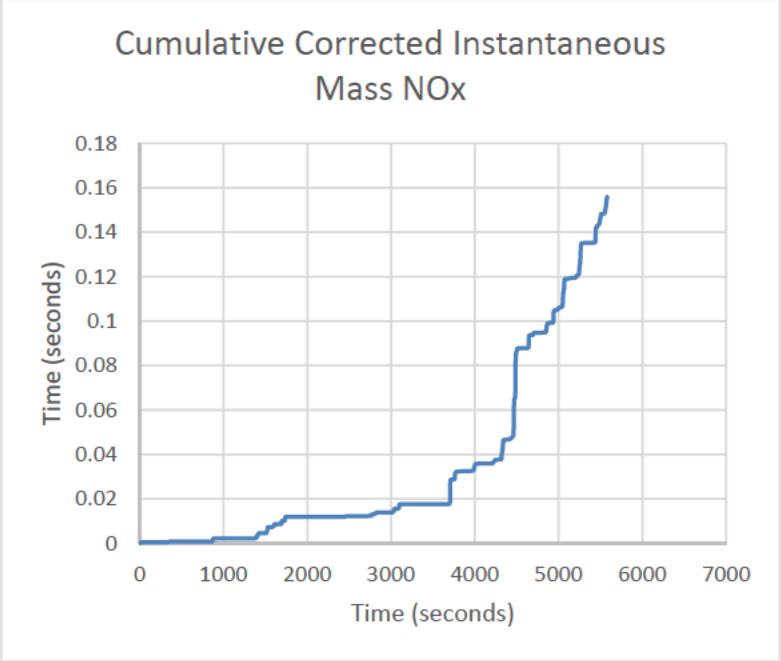


Figure 12.1.6: Vehicle 12 – Steady State Cumulative Corrected Instantaneous Mass NOx

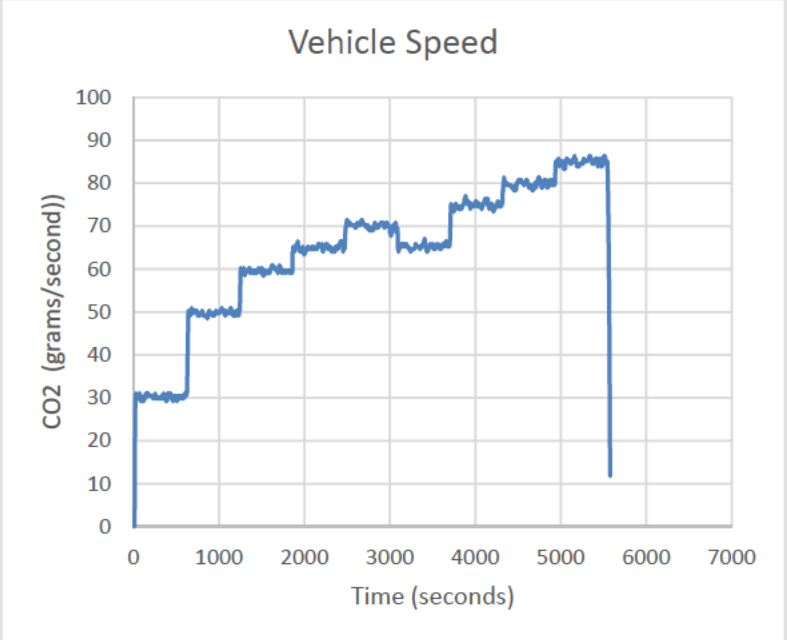


Figure 12.1.7: Vehicle 12 – Steady State Vehicle Speed

ii. 80 MPH Steady State Cruise PEMS Test

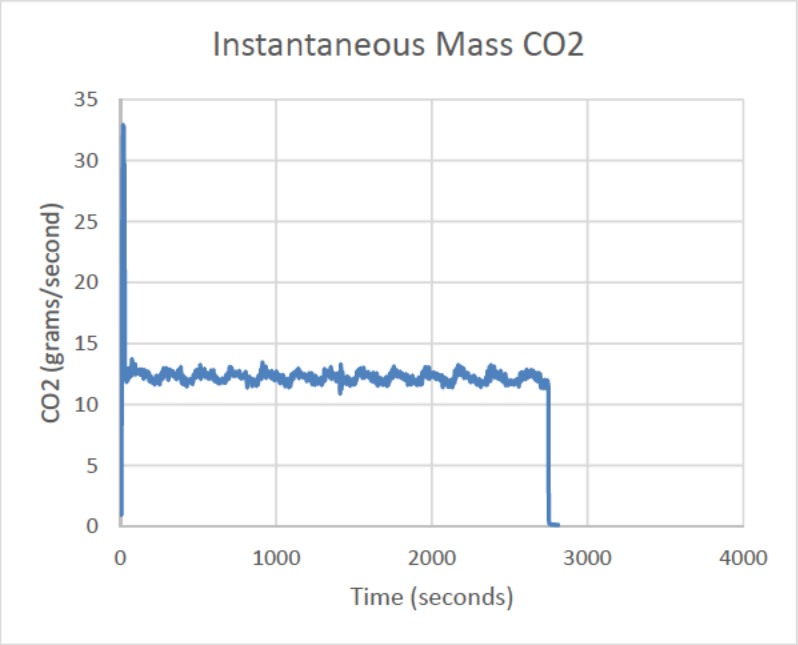


Figure 12.2.1: Vehicle 12 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

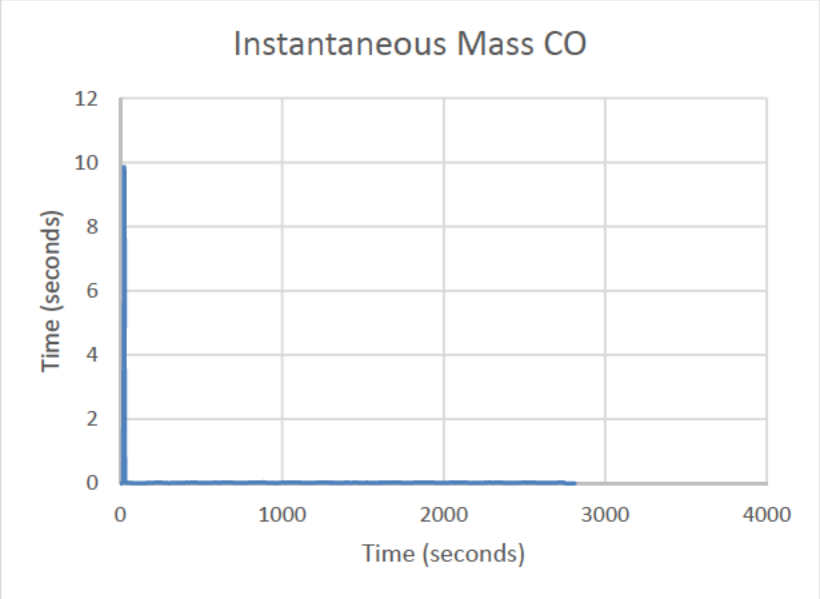


Figure 12.2.2: Vehicle 12 – 80 MPH Steady State Cruise Instantaneous Mass CO

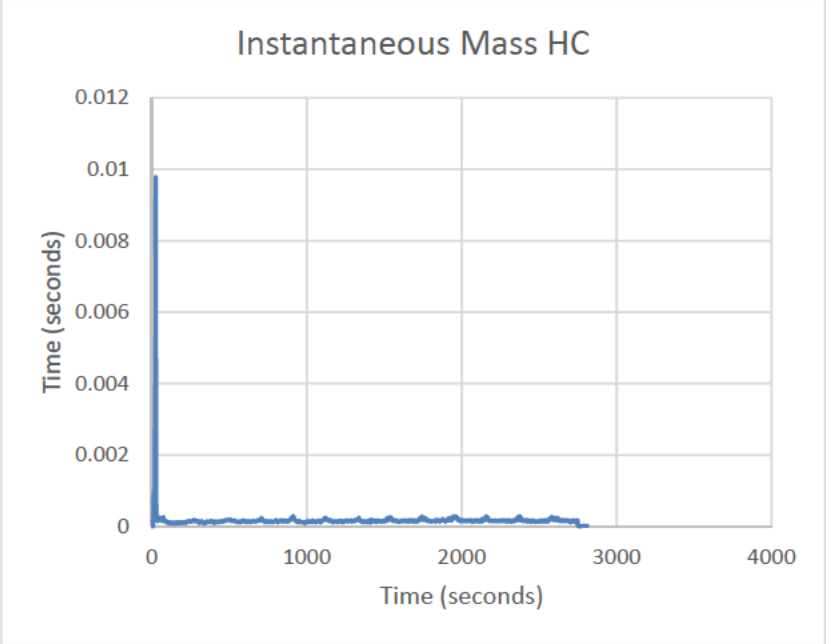


Figure 12.2.3: Vehicle 12 – 80 MPH Steady State Cruise Instantaneous Mass HC

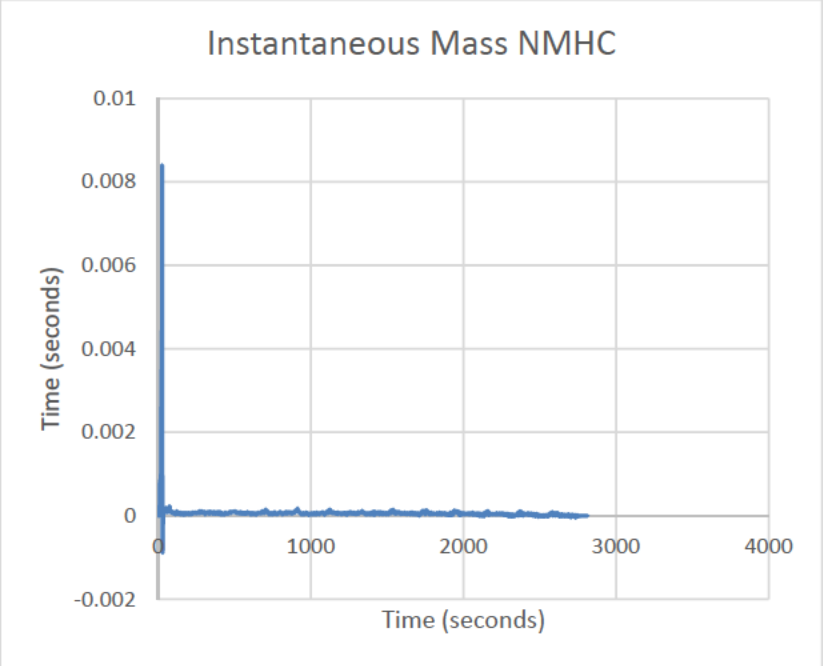


Figure 12.2.4: Vehicle 12 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

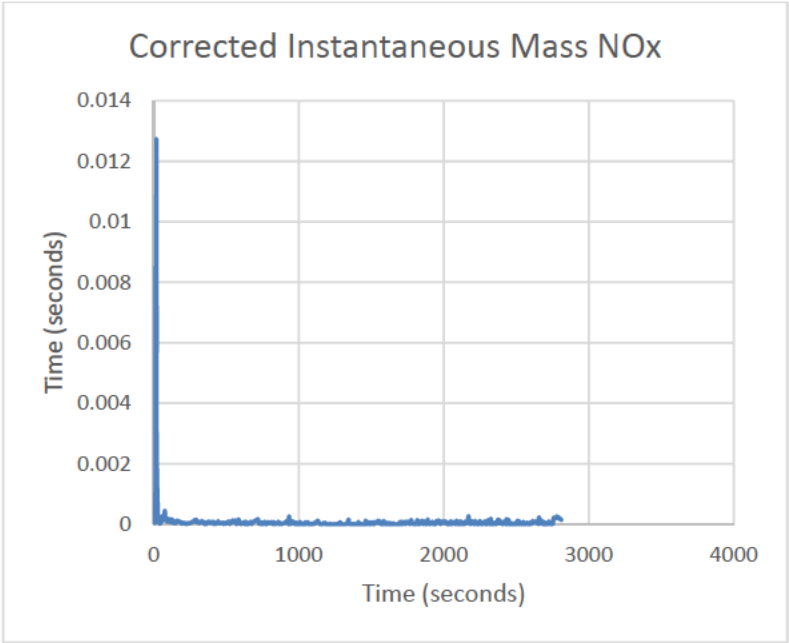


Figure 12.2.5: Vehicle 12 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

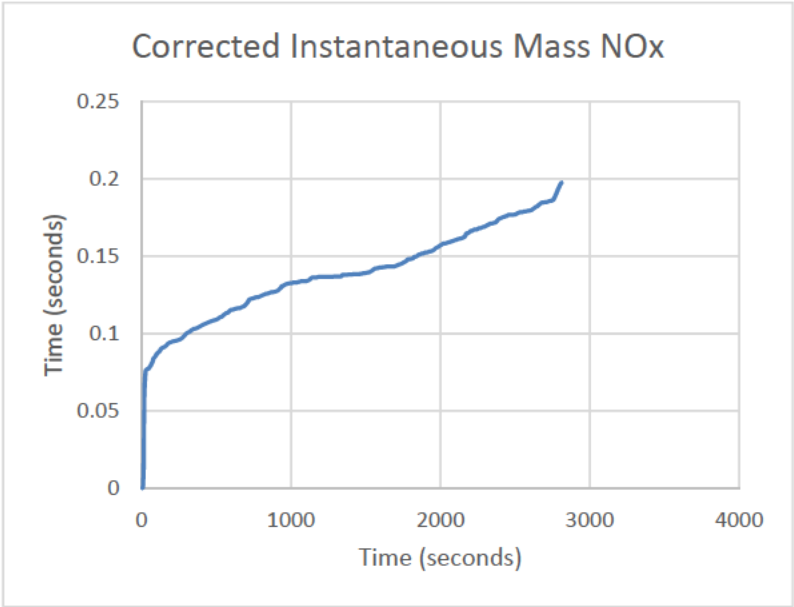


Figure 12.2.6: Vehicle 12 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

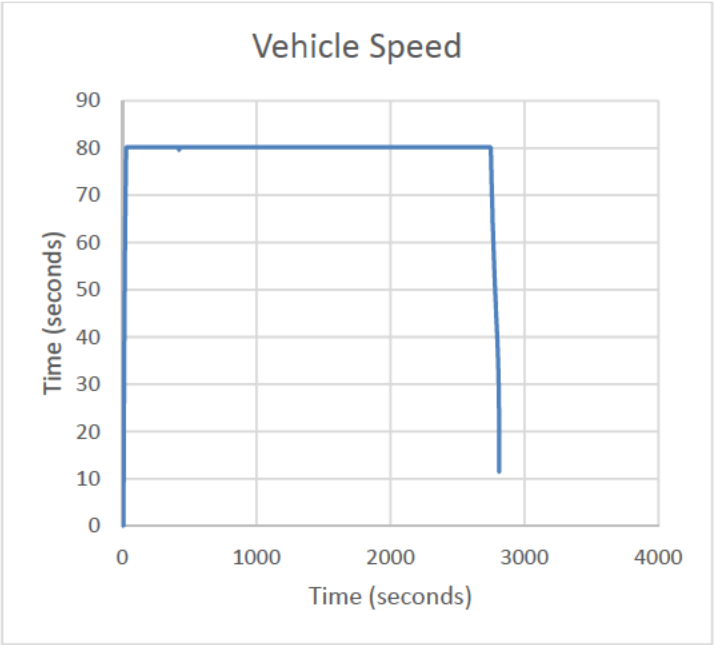


Figure 12.2.7: Vehicle 12 – 80 MPH Steady State Cruise Vehicle Speed

iii. Transient Cycle PEMS Test

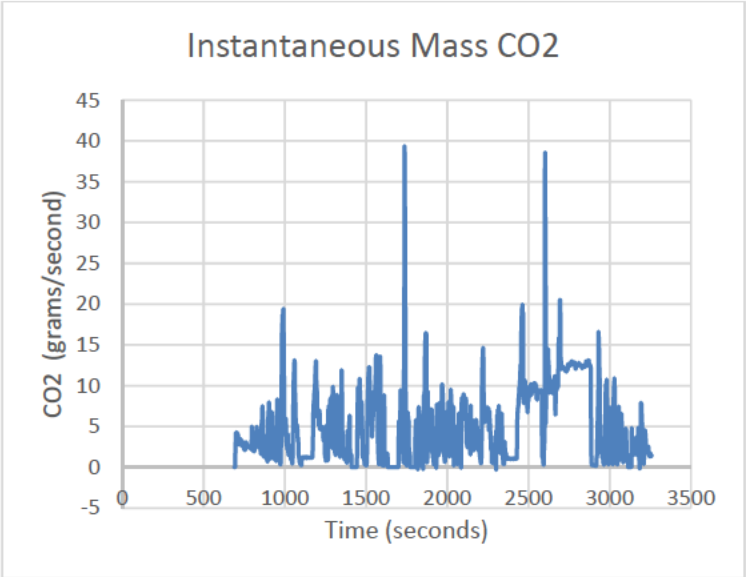


Figure 12.3.1: Vehicle 12 – Transient Cycle Instantaneous Mass CO_2

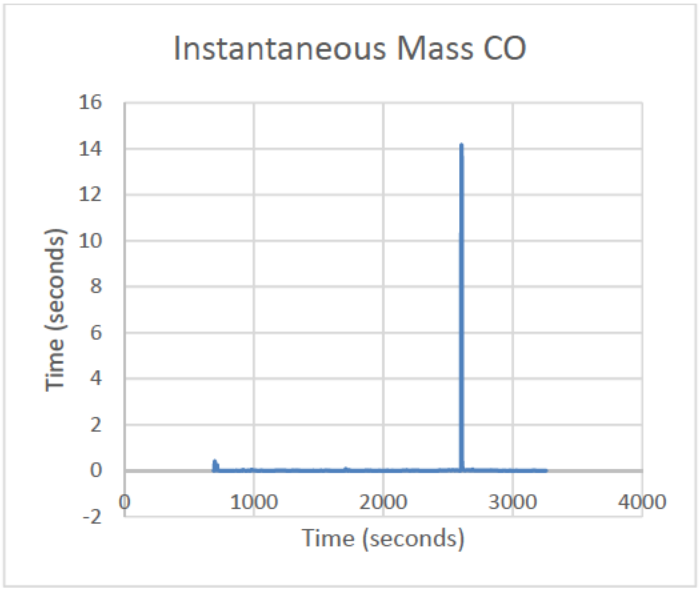


Figure 12.3.2: Vehicle 12 – Transient Cycle Instantaneous Mass CO

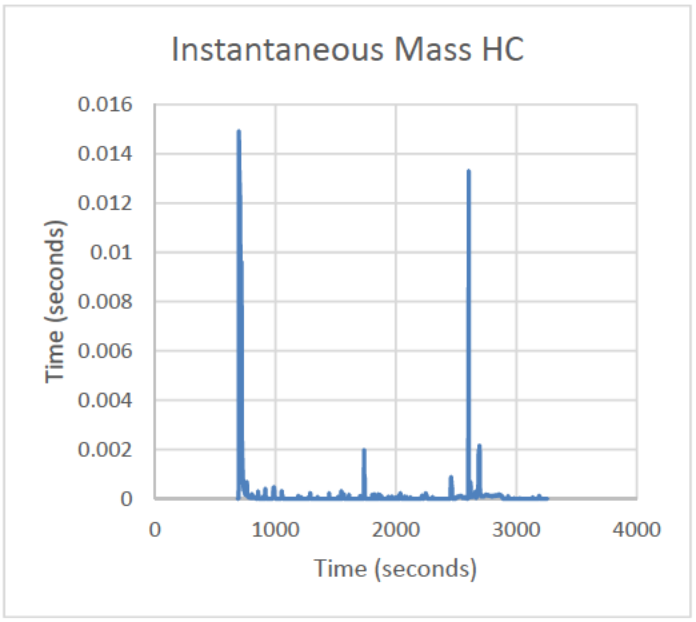


Figure 12.3.3: Vehicle 12 – Transient Cycle Instantaneous Mass HC

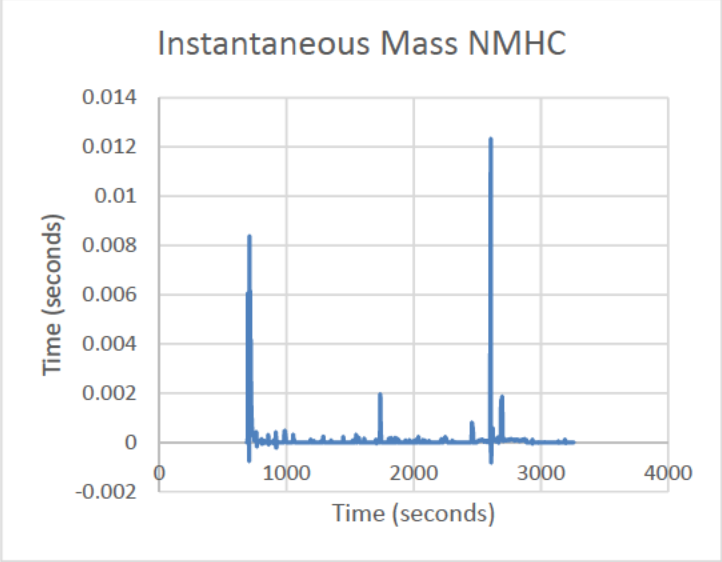


Figure 12.3.4: Vehicle 12 – Transient Cycle Instantaneous Mass NMHC

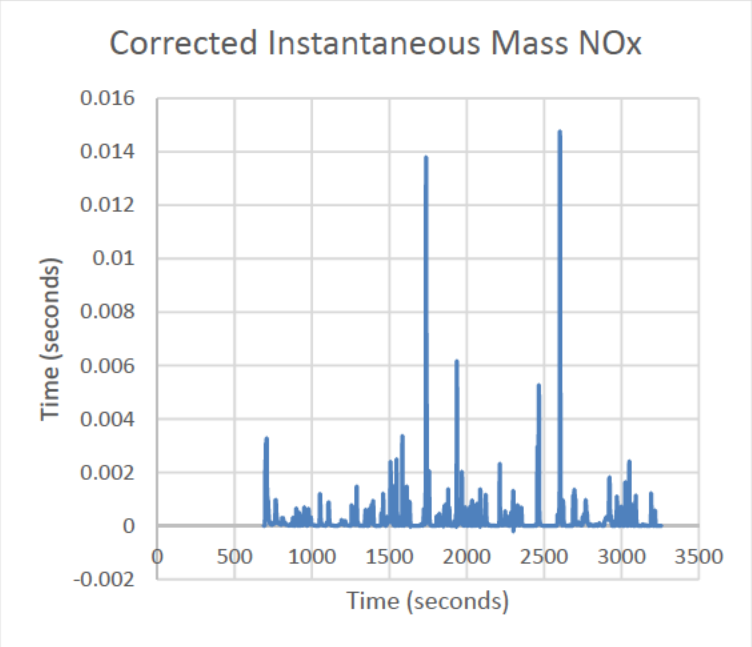


Figure 12.3.5: Vehicle 12 – Transient Cycle Instantaneous Mass NOx

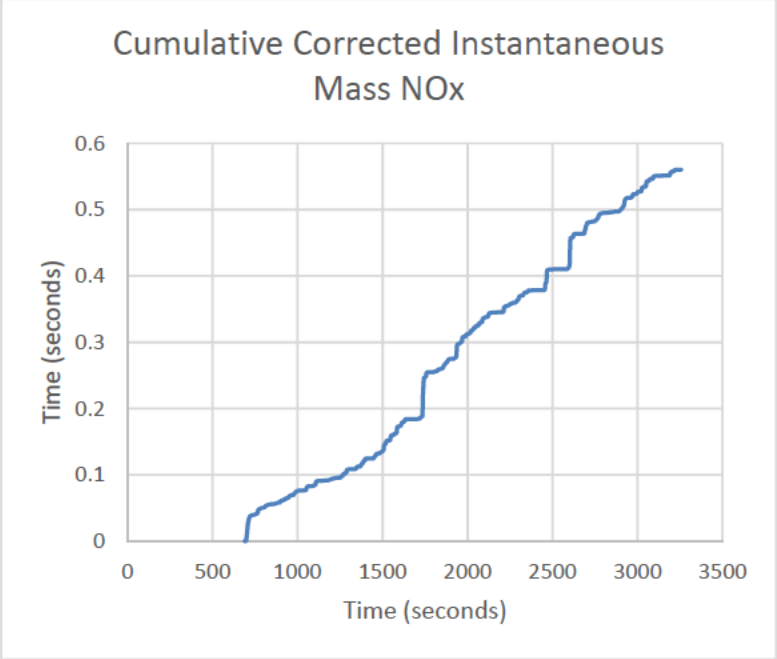


Figure 12.3.6: Vehicle 12 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

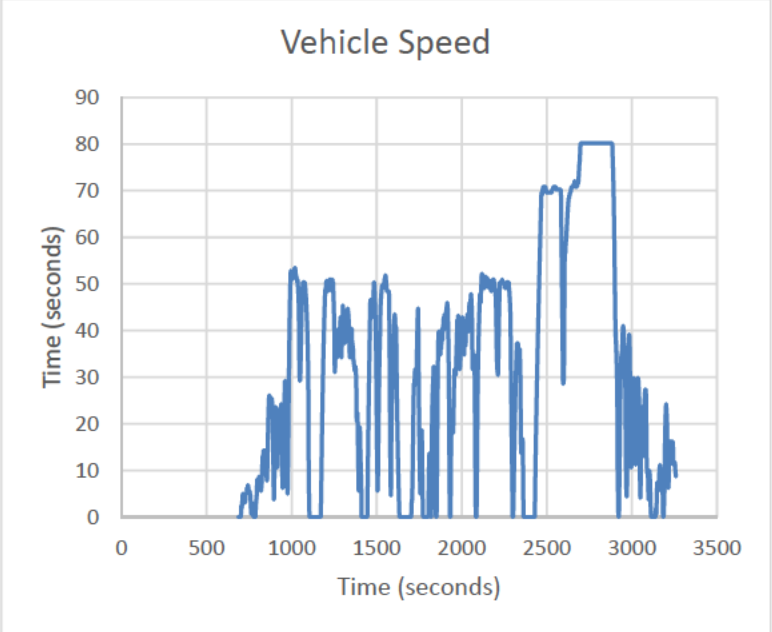


Figure 12.3.7: Vehicle 12 – Transient Cycle Vehicle Speed

13. Vehicle 13 - KCRXT05.75P2 - V9DS16500 Ram 1500 5.7L 8-speed Automatic 2WD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0042	386.0033	0.0167	0.0016	0.0026
50	0.0041	353.9434	0.2285	0.0058	0.0084
60	0.0182	373.3566	0.6425	0.0141	0.0233
65	0.0106	411.4524	0.6339	0.0098	0.0178
70	0.0076	451.5020	0.6045	0.0079	0.0145
65	0.0068	411.1128	0.1872	0.0031	0.0047
75	0.0045	482.1701	0.7359	0.0053	0.0124
80	0.0026	511.1277	0.5434	0.0029	0.0083
85	0.0037	551.9795	0.6179	0.0021	0.0070

Table 13.1: Vehicle 13 – Steady State
File: V9DS16500_SSPEMS010219102880

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0005	510.7810	0.6160	0.0027	0.0071

Table 13.2: Vehicle 13 – 80 MPH Steady State Cruise
File: V9DS16500_80SS45010319102980

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0233	551.7568	6.8499	0.0189	0.0359

Table 13.3: Vehicle 13 – Transient Cycle
File: V9DS16500_P-IUVP010219102980

b. Summary Plots

i. Steady State PEMS Test

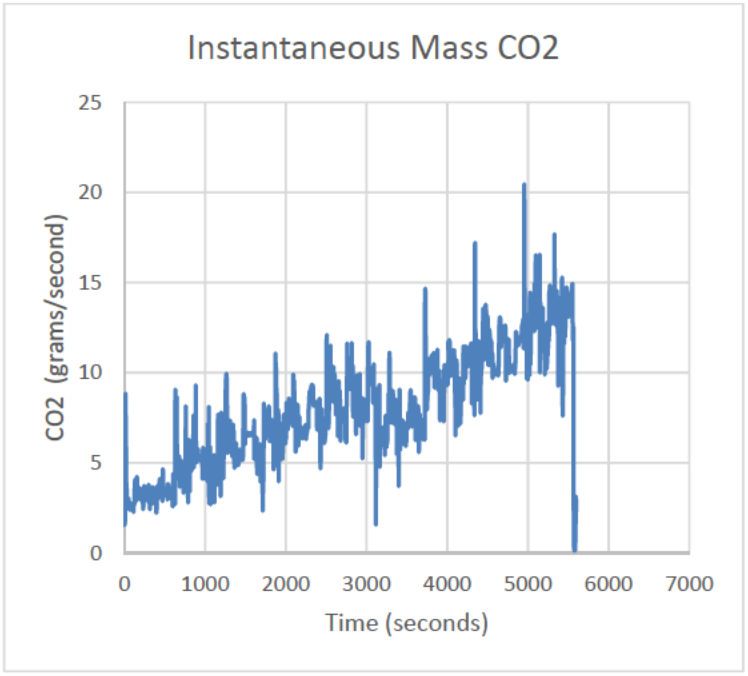


Figure 13.1.1: Vehicle 13 – Steady State Instantaneous Mass CO_2

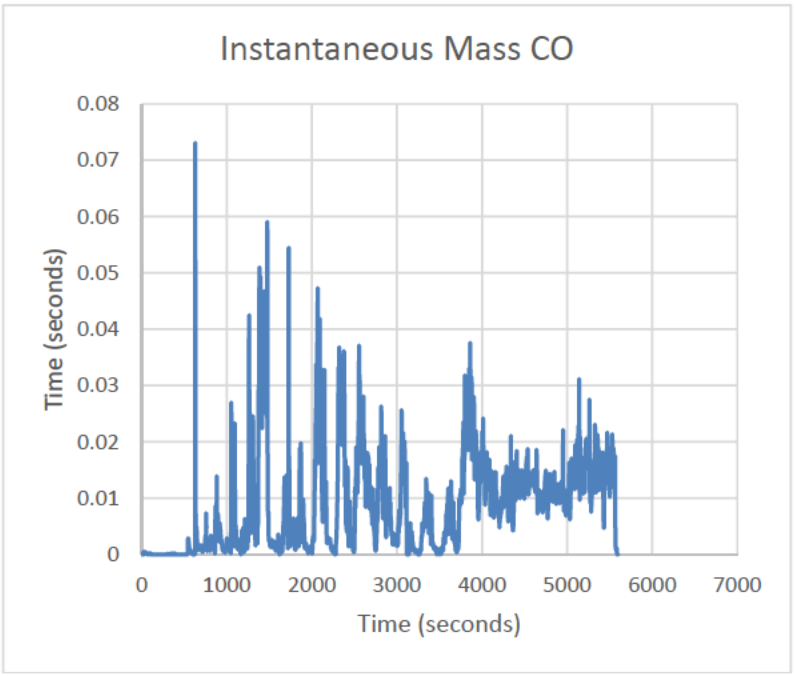


Figure 13.1.2: Vehicle 13 – Steady State Instantaneous Mass CO

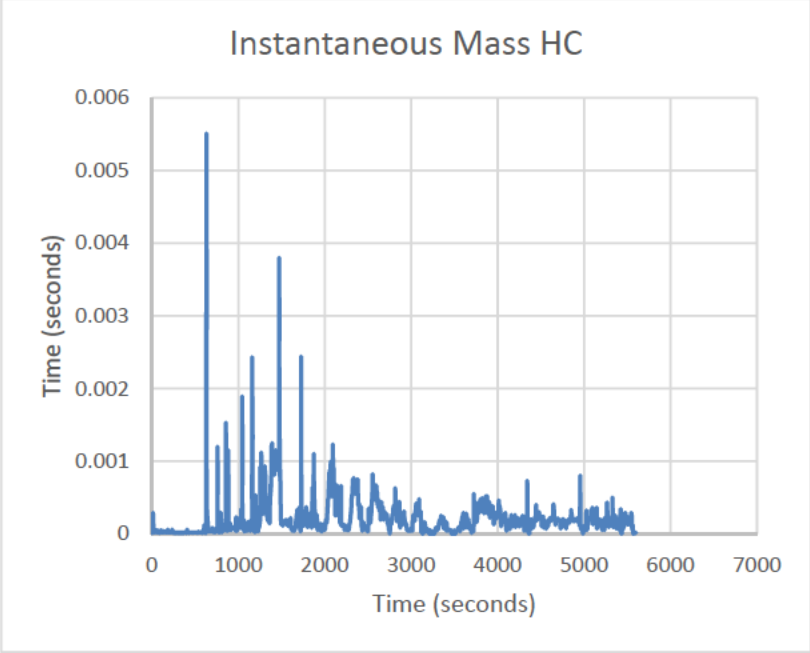


Figure 13.1.3: Vehicle 13 – Steady State Instantaneous Mass HC

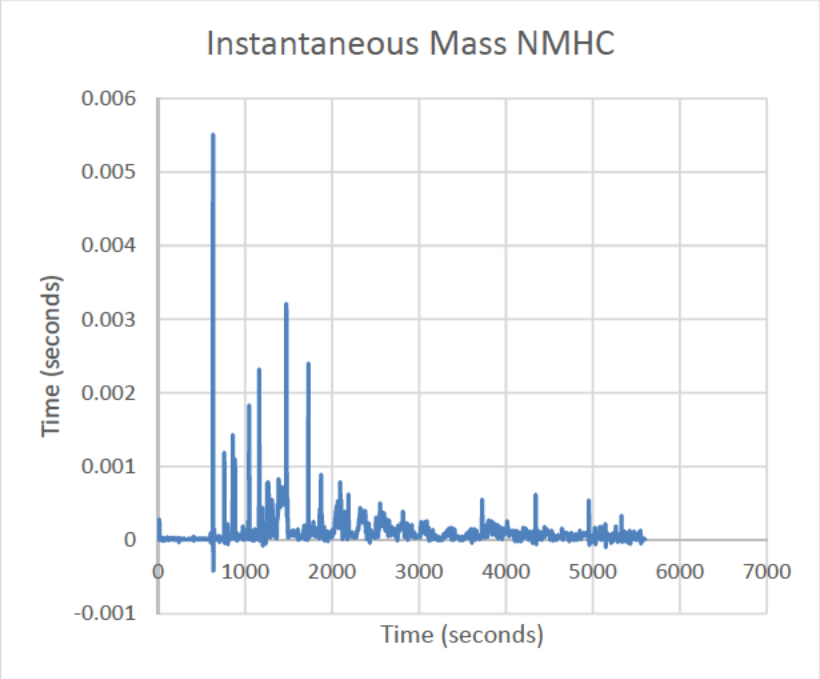


Figure 13.1.4: Vehicle 13 – Steady State Instantaneous Mass NMHC

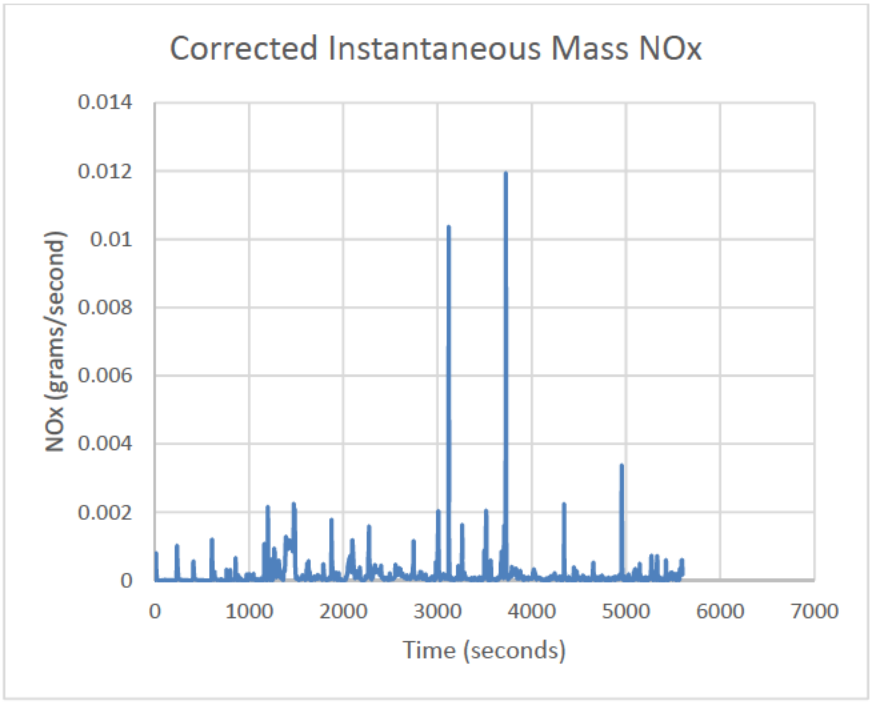


Figure 13.1.5: Vehicle 13 – Steady State Corrected Instantaneous Mass NOx

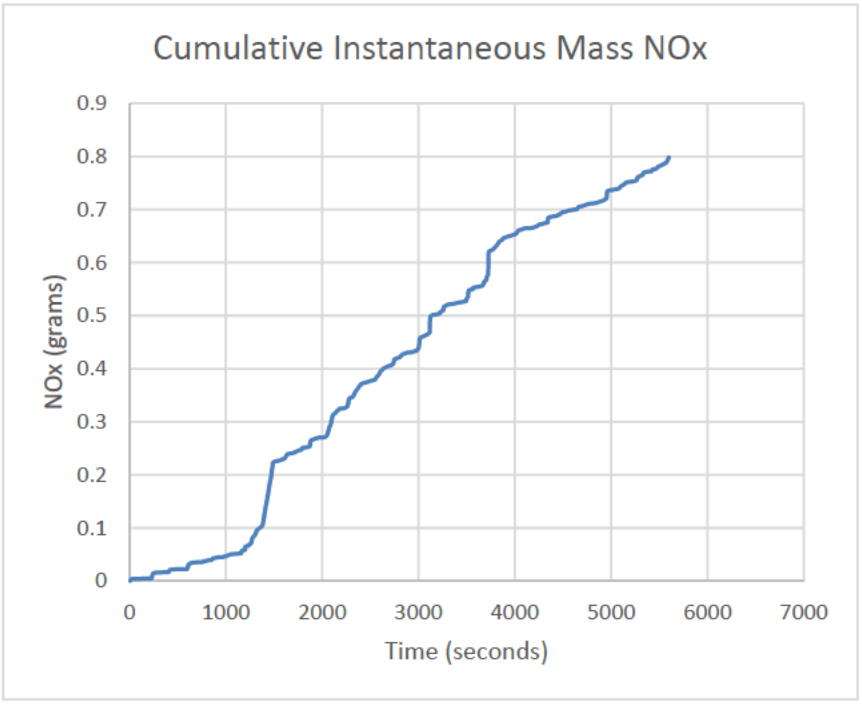


Figure 13.1.6: Vehicle 13 – Steady State Cumulative Corrected Instantaneous Mass NOx

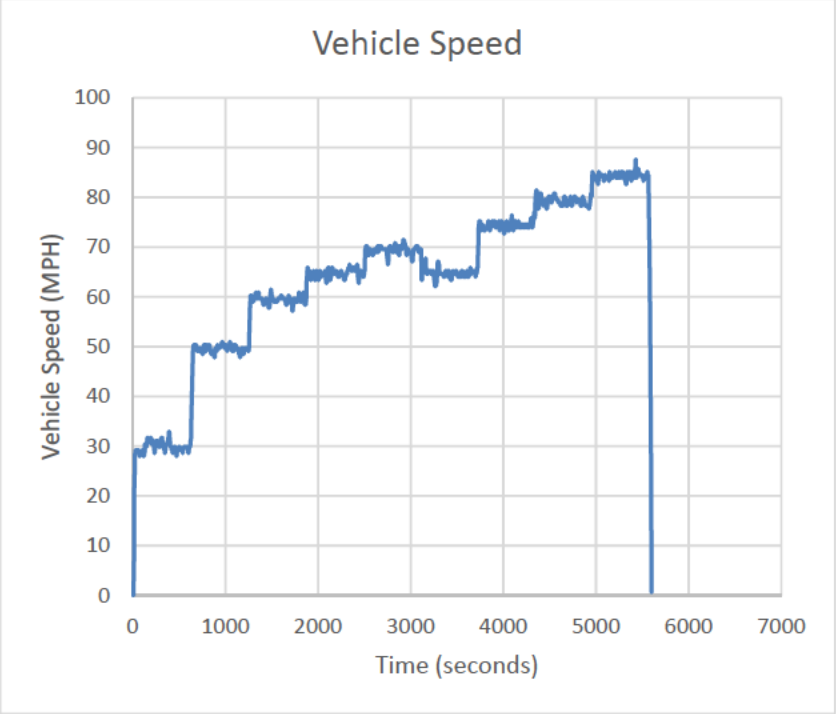


Figure 13.1.7: Vehicle 13 – Steady State Vehicle Speed

ii. 80 MPH Steady State Cruise PEMS Test

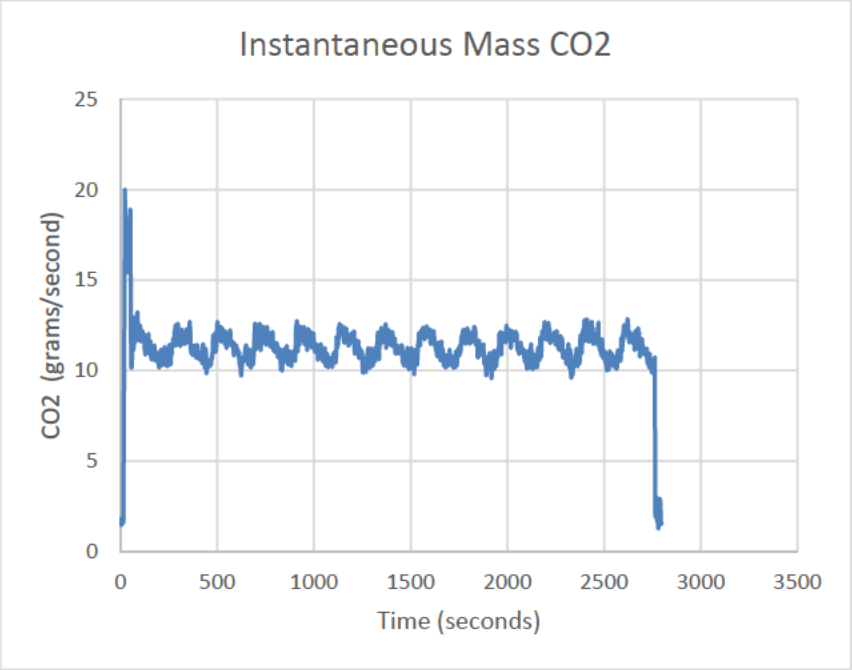


Figure 13.2.1: Vehicle 13 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

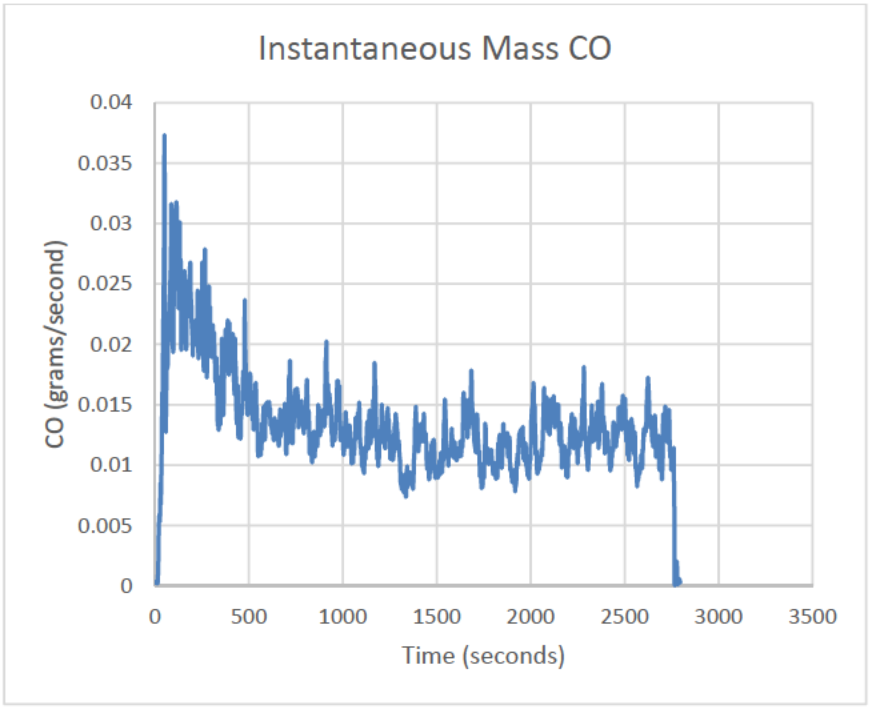


Figure 13.2.2: Vehicle 13 – 80 MPH Steady State Cruise Instantaneous Mass CO

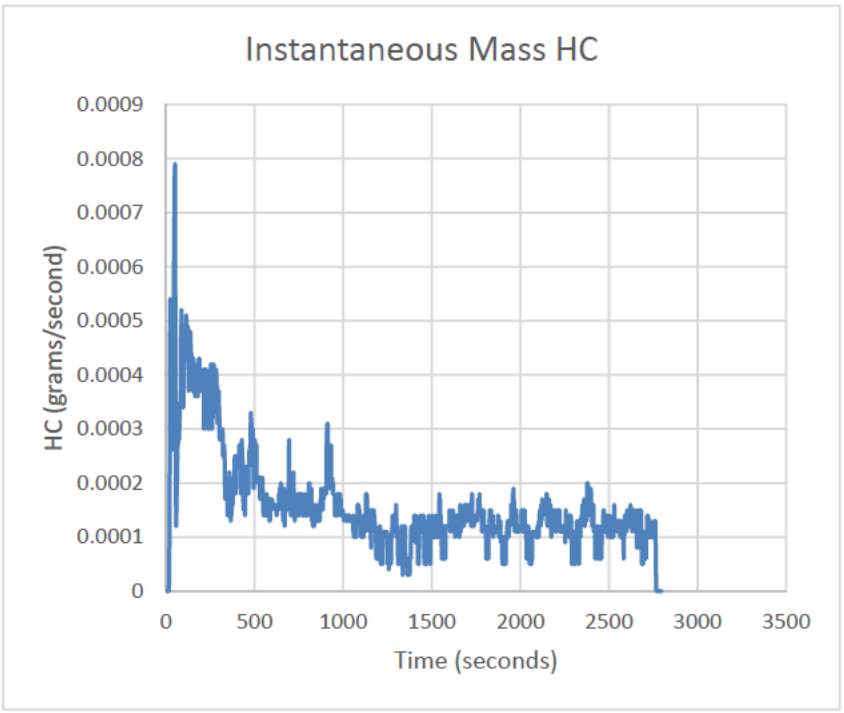


Figure 13.2.3: Vehicle 13 – 80 MPH Steady State Cruise Instantaneous Mass HC

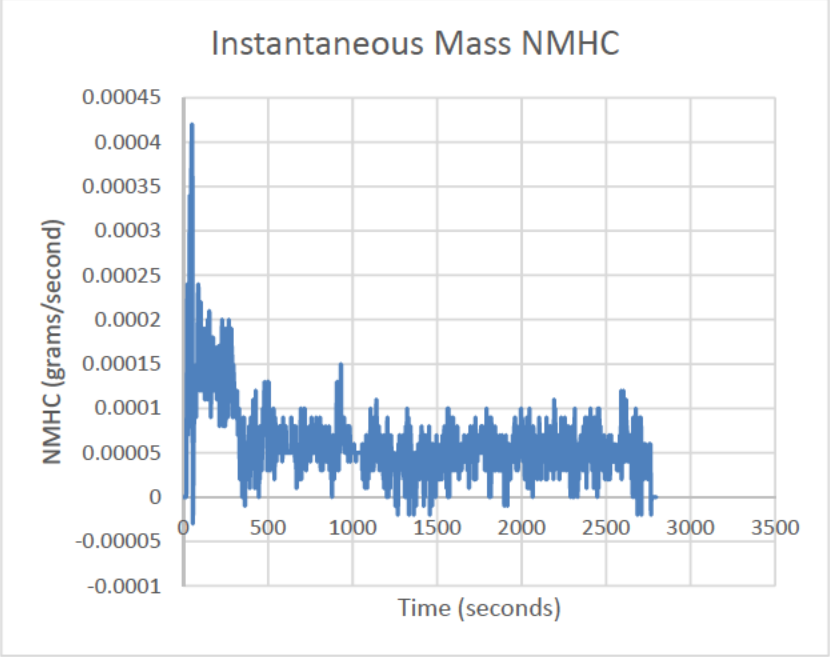


Figure 13.2.4: Vehicle 13 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

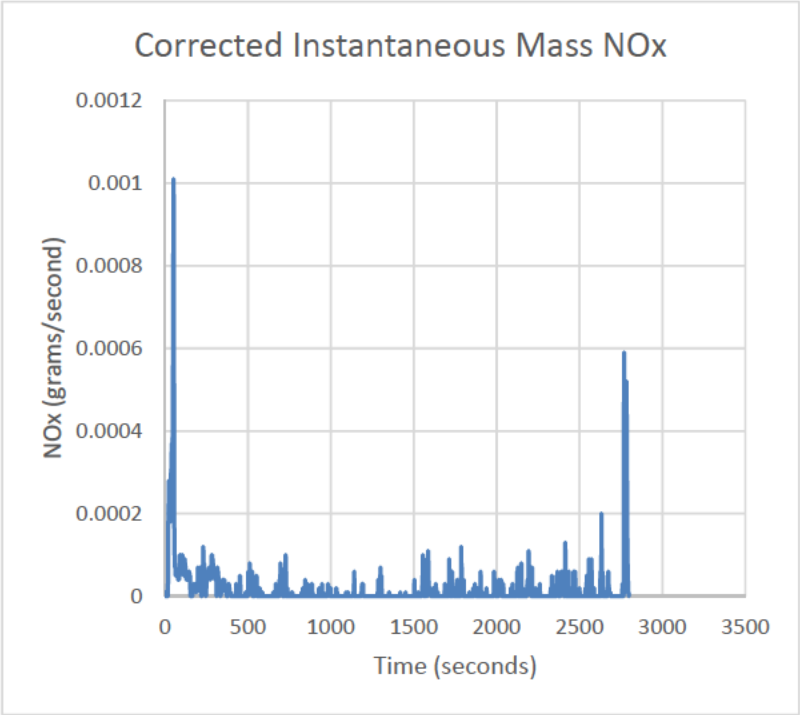


Figure 13.2.5: Vehicle 13 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

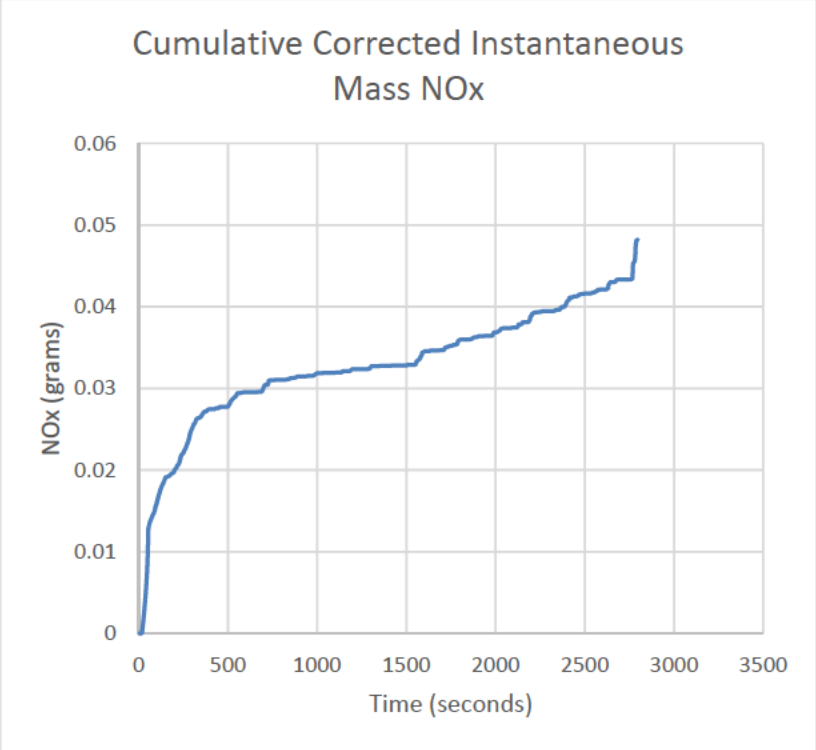


Figure 13.2.6: Vehicle 13 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

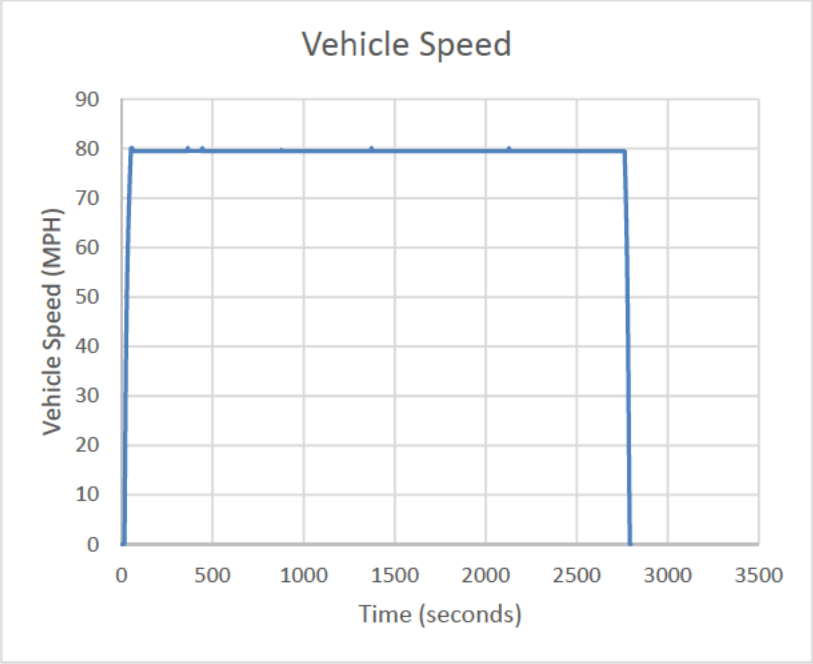


Figure 13.2.7: Vehicle 13 – 80 MPH Steady State Cruise Vehicle Speed

iii. Transient Cycle PEMS Test

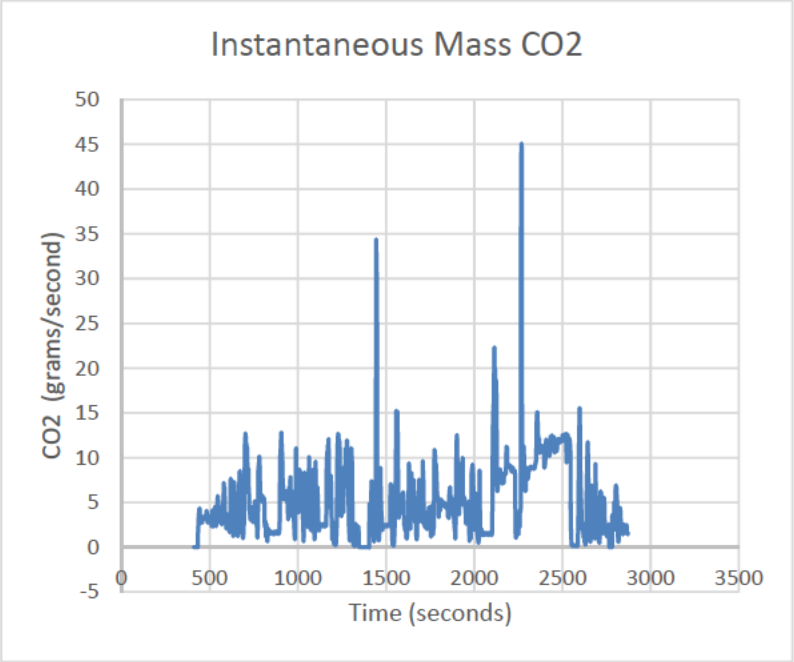


Figure 13.3.1: Vehicle 13 – Transient Cycle Instantaneous Mass CO_2

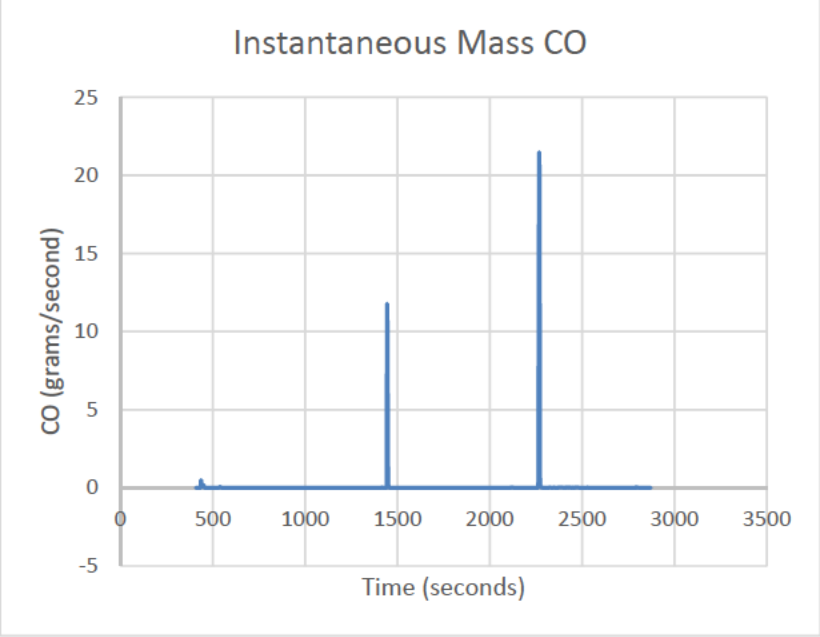


Figure 13.3.2: Vehicle 13 – Transient Cycle Instantaneous Mass CO

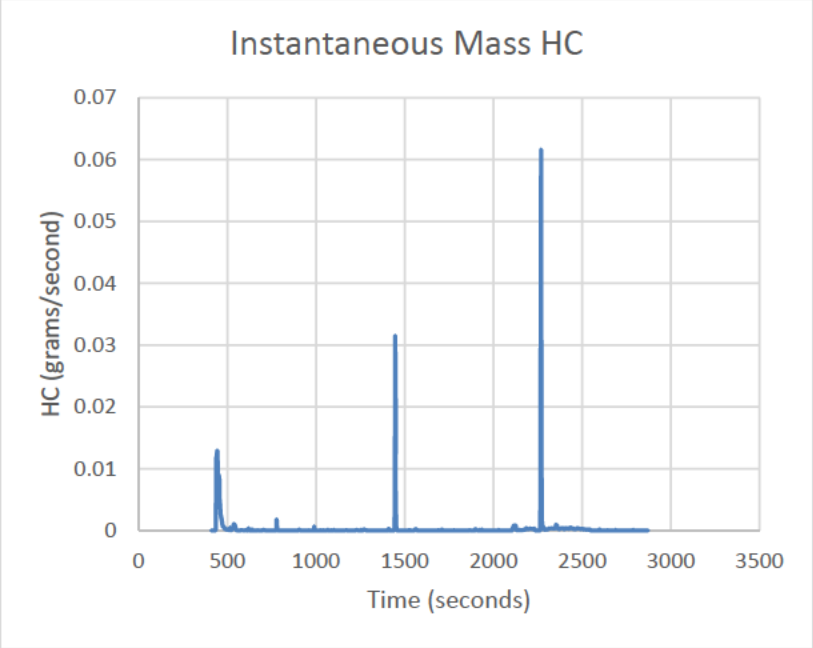


Figure 13.3.3: Vehicle 13 – Transient Cycle Instantaneous Mass HC

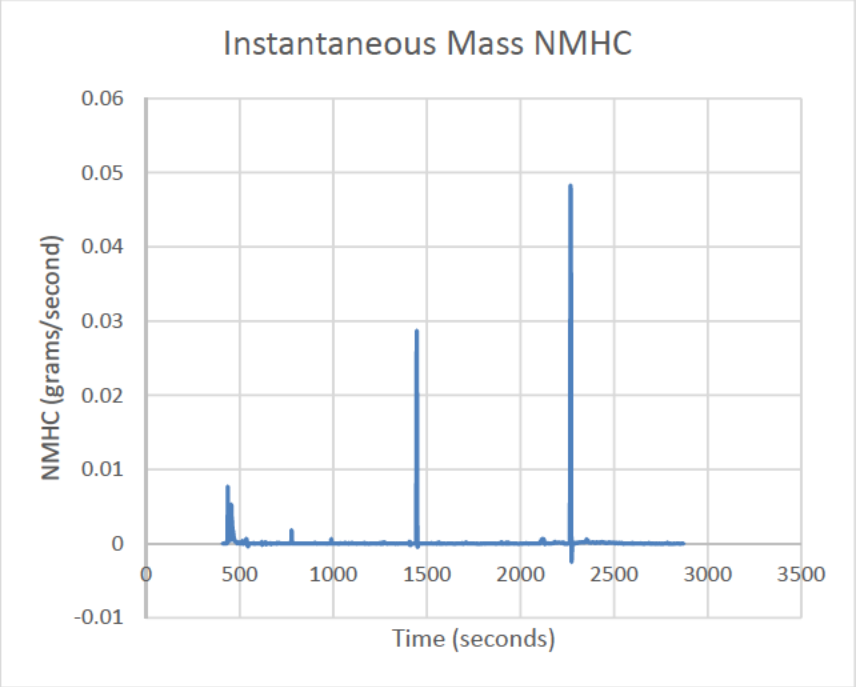


Figure 13.3.4: Vehicle 13 – Transient Cycle Instantaneous Mass NMHC

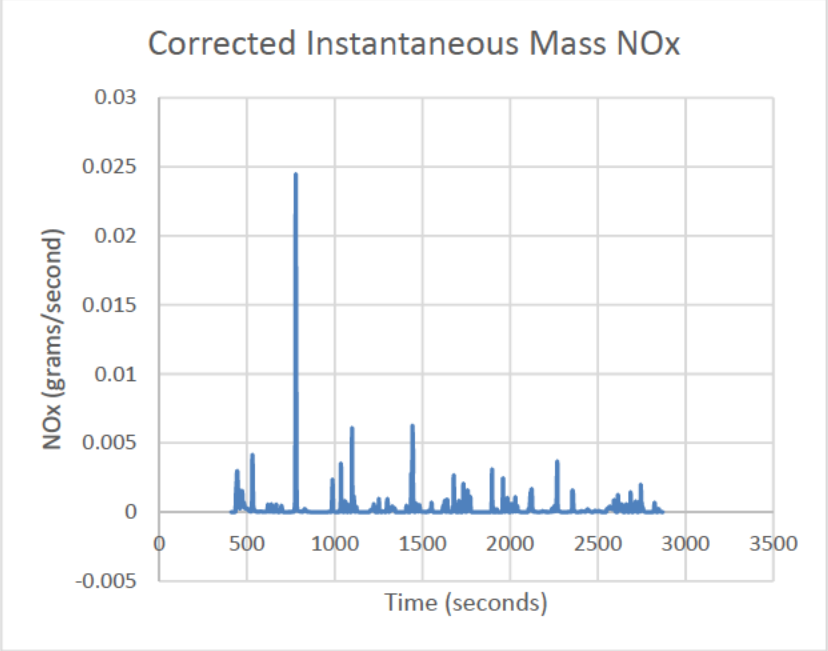


Figure 13.3.5: Vehicle 13 – Transient Cycle Instantaneous Mass NOx

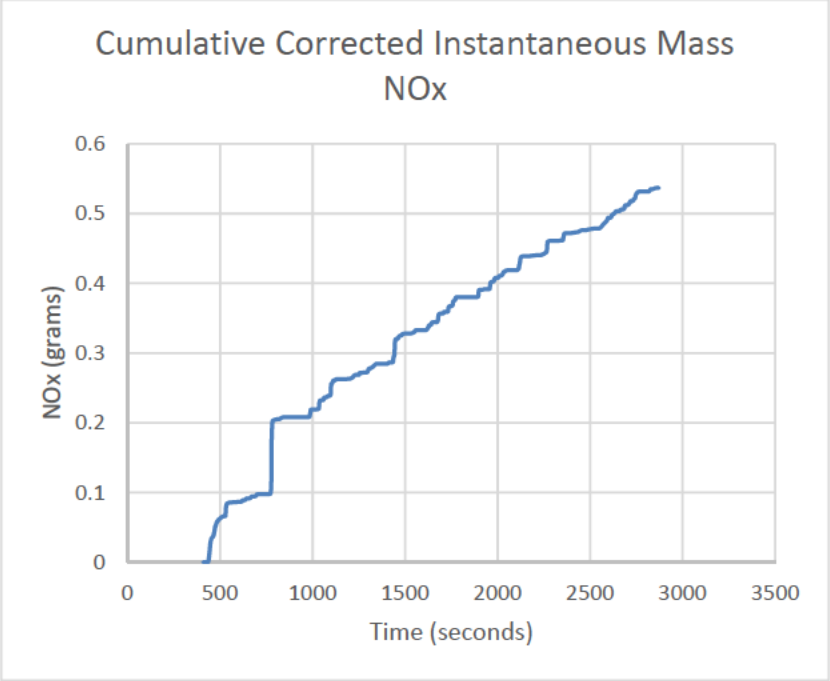


Figure 13.3.6: Vehicle 13 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

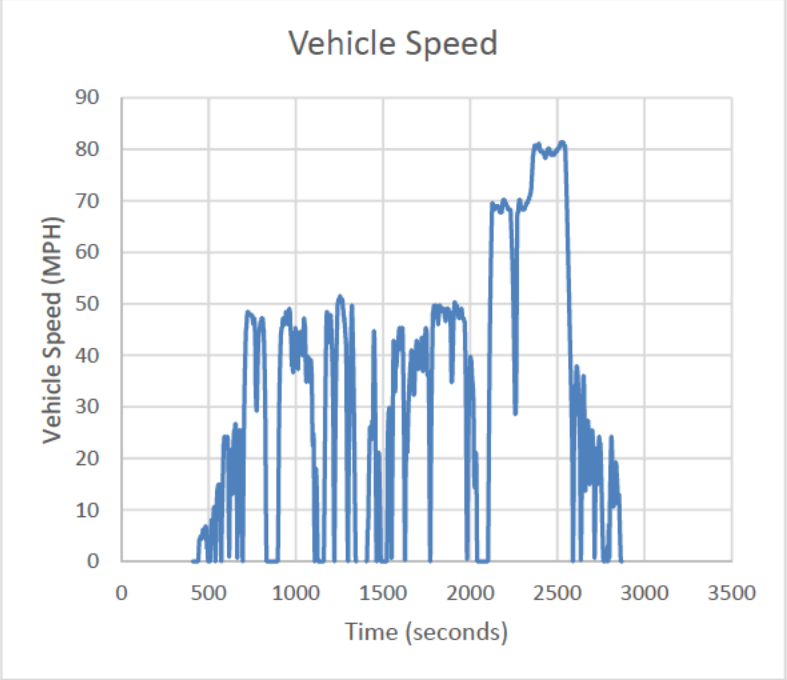


Figure 13.3.7: Vehicle 13 – Transient Cycle Vehicle Speed

14. Vehicle 14 - KCRXT06.25P1 - V9WKJ1034 Jeep Grand Cherokee 6.2L 8-speed Automatic 4WD

a. Summary Tables

Steady State	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
30	0.0052	403.8878	0.2055	0.0014	0.0028
50	0.0021	416.2379	0.4699	0.0004	0.0020
60	0.0032	471.3474	0.7810	0.0013	0.0079
65	0.0000	505.2743	1.1425	0.0066	0.0181
70	0.0000	528.1829	1.4664	0.0061	0.0200
65	0.0000	498.7451	1.0667	0.0024	0.0117
75	0.0001	560.8181	1.5891	0.0034	0.0193
80	0.0000	585.3141	1.6451	0.0028	0.0164
85	0.0004	623.0280	2.0891	0.0032	0.0160

Table 14.1: Vehicle 14 – Steady State
File: V9WKJ1034_SSPEMS010119102880

80 MPH Steady State Cruise	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
80	0.0001	594.6708	1.4122	0.0040	0.0139

Table 14.2: Vehicle 14 – 80 MPH Steady State Cruise
File: V9WKJ1034_80SS45010419102780

Transient Cycle	NOx (g/mile)	CO2 (g/mile)	CO (g/mile)	NMHC (g/mile)	HC (g/mile)
Various	0.0369	634.1572	6.0605	0.0576	0.0886

Table 14.3: Vehicle 14 – Transient Cycle
File: V9WKJ1034_P-IUVP010319102780

b. Summary Plots

i. Steady State PEMS Test

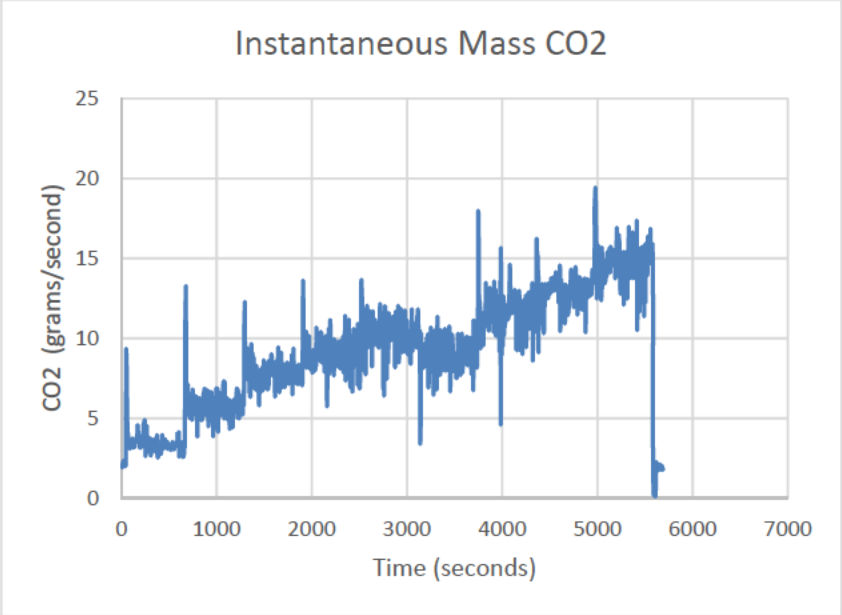


Figure 14.1.1: Vehicle 14 – Steady State Instantaneous Mass CO_2

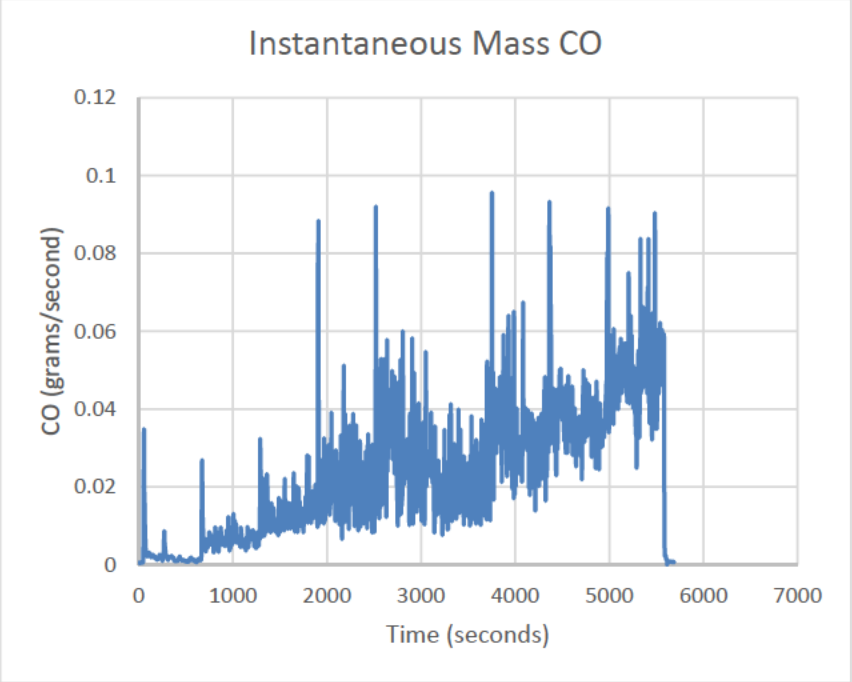


Figure 14.1.2: Vehicle 14 – Steady State Instantaneous Mass CO

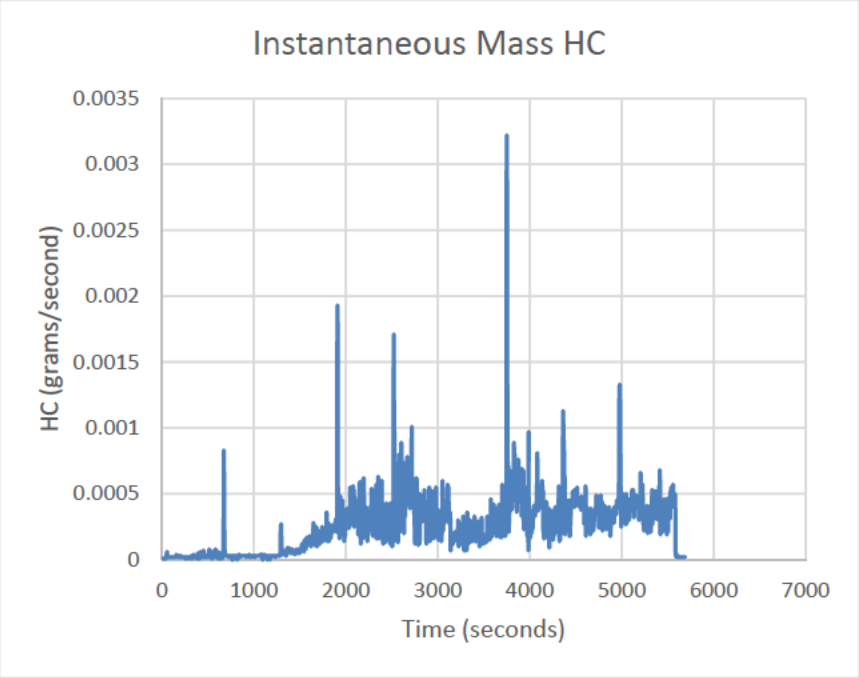


Figure 14.1.3: Vehicle 14 – Steady State Instantaneous Mass HC

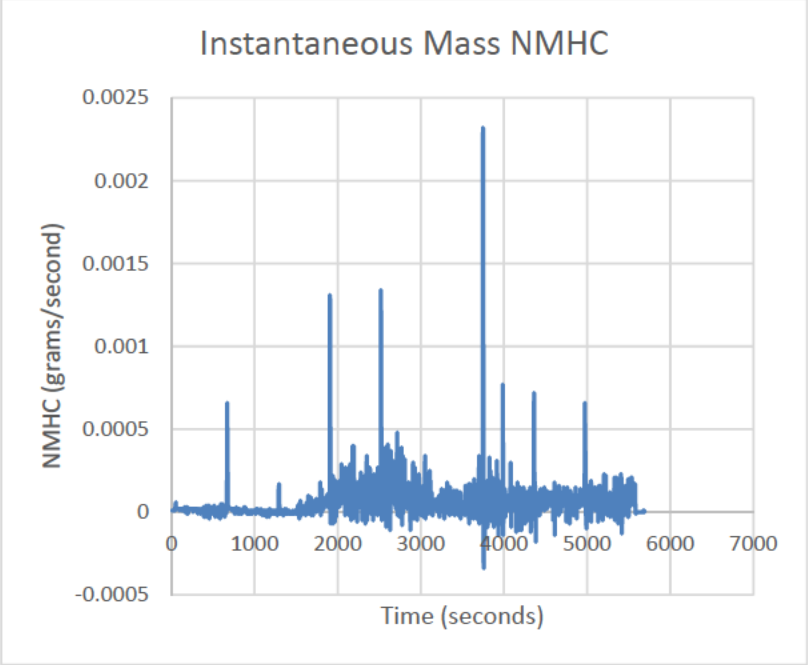


Figure 14.1.4: Vehicle 14 – Steady State Instantaneous Mass NMHC

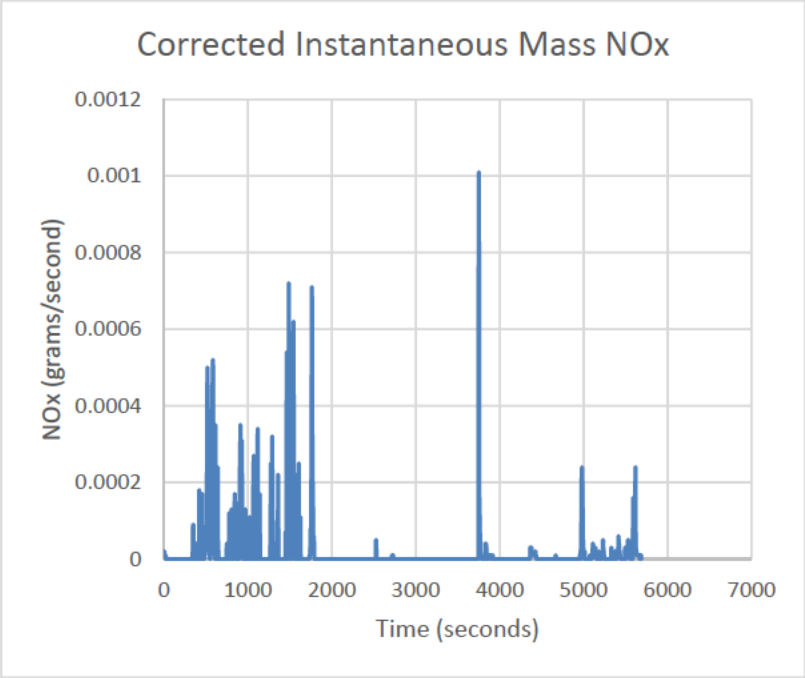


Figure 14.1.5: Vehicle 14 – Steady State Corrected Instantaneous Mass NOx

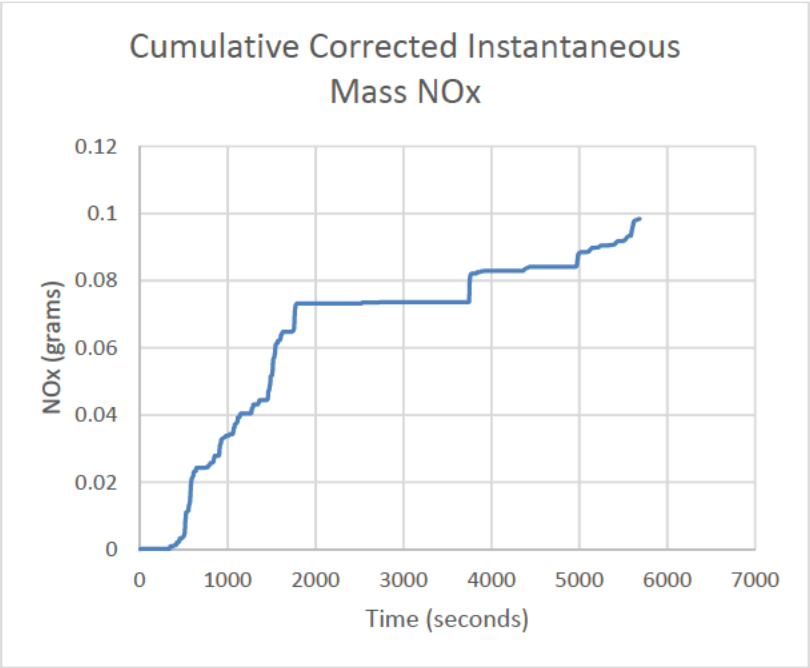


Figure 14.1.6: Vehicle 14 – Steady State Cumulative Corrected Instantaneous Mass NOx

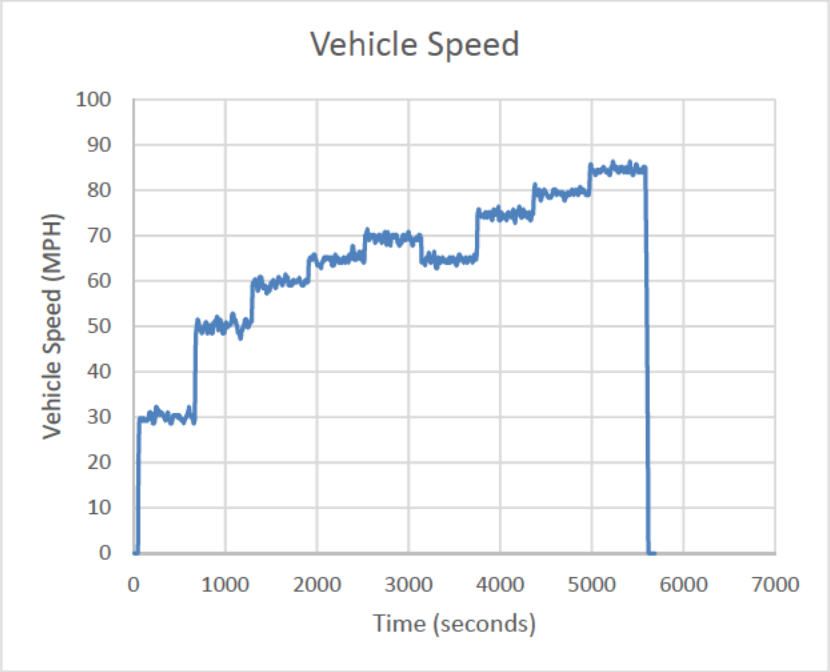


Figure 14.1.7: Vehicle 14 – Steady State Vehicle Speed

ii. 80 MPH Steady State Cruise PEMS Test

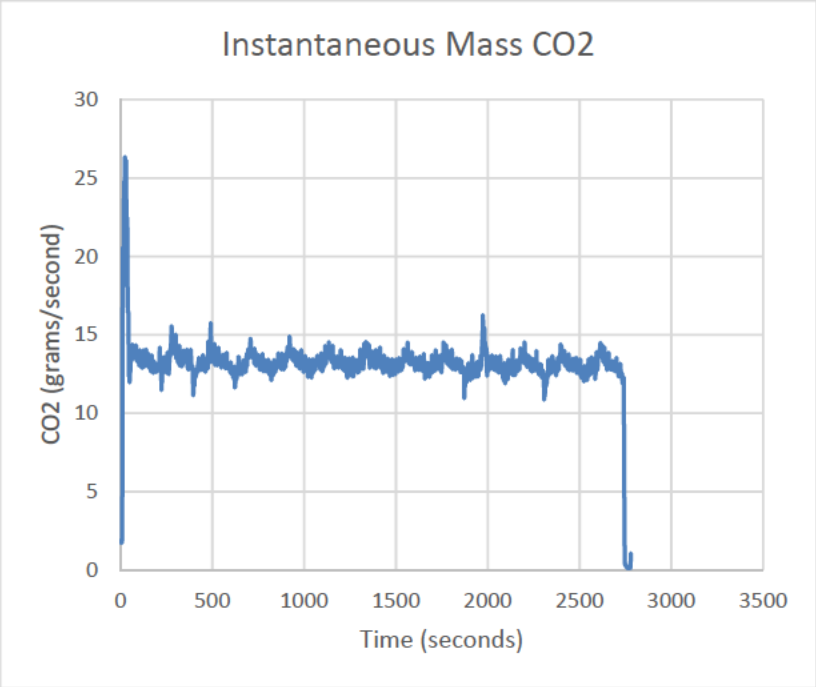


Figure 14.2.1: Vehicle 14 – 80 MPH Steady State Cruise Instantaneous Mass CO_2

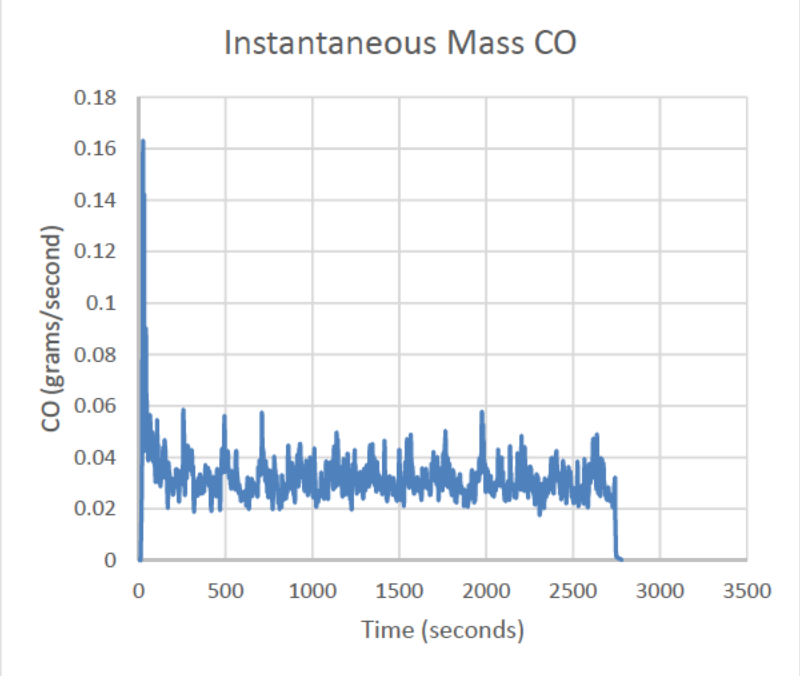


Figure 14.2.2: Vehicle 14 – 80 MPH Steady State Cruise Instantaneous Mass CO

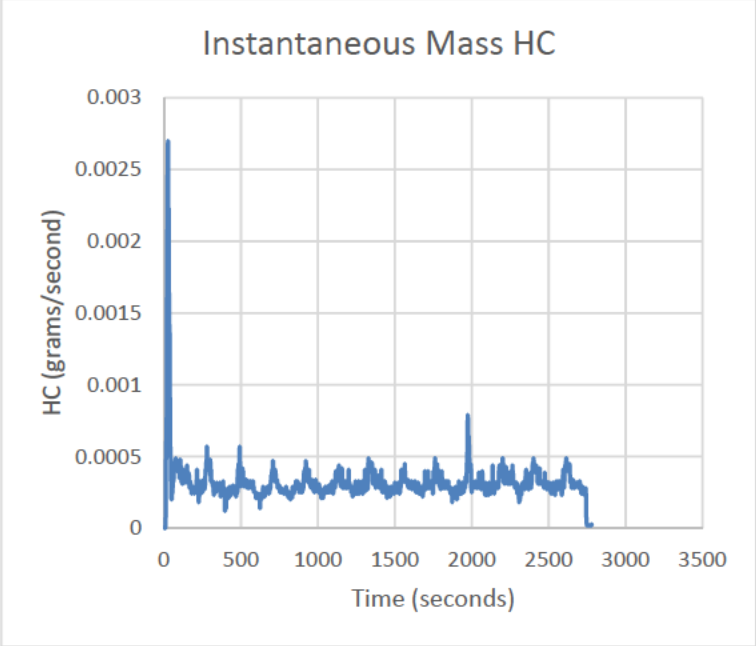


Figure 14.2.3: Vehicle 14 – 80 MPH Steady State Cruise Instantaneous Mass HC

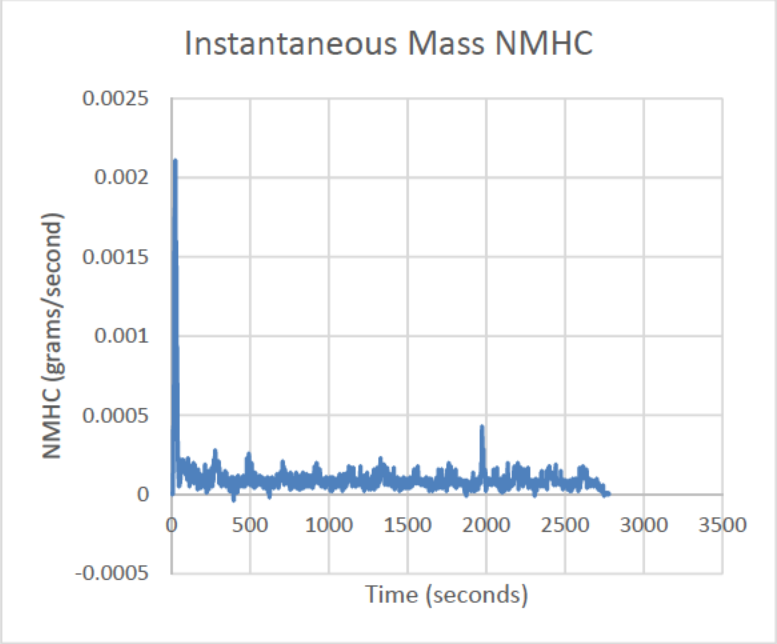


Figure 14.2.4: Vehicle 14 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

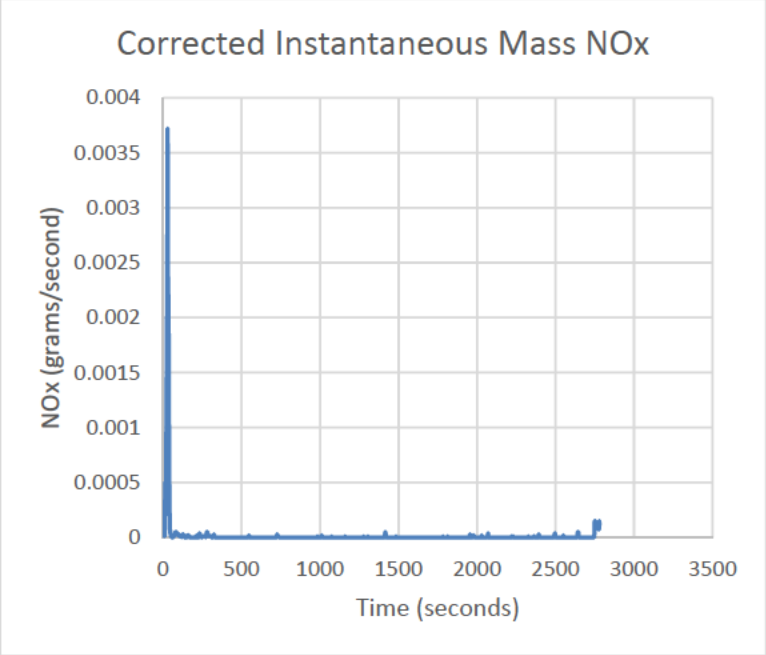


Figure 14.2.5: Vehicle 14 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

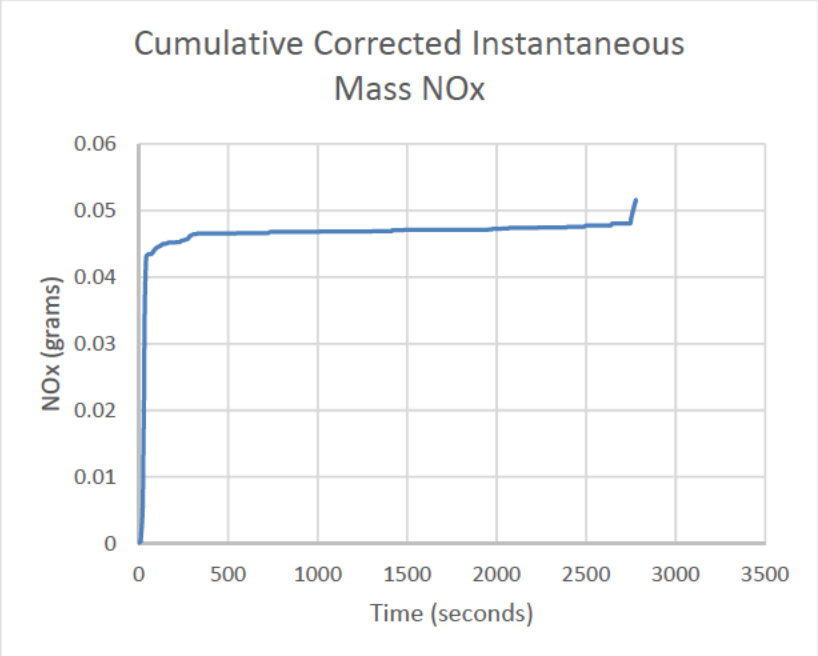


Figure 14.2.6: Vehicle 14 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

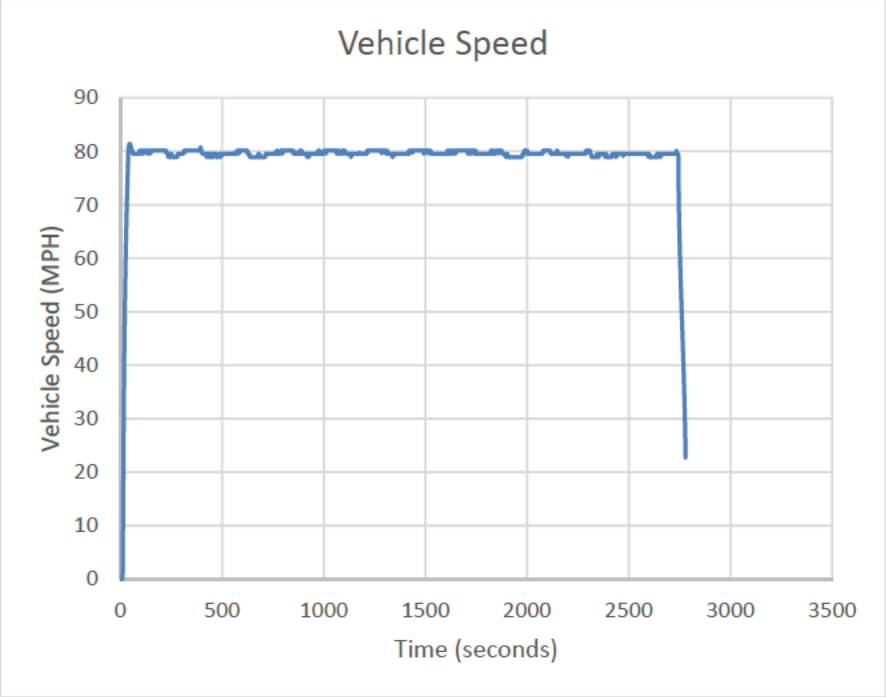


Figure 14.2.7: Vehicle 14 – 80 MPH Steady State Cruise Vehicle Speed

iii. Transient Cycle PEMS Test

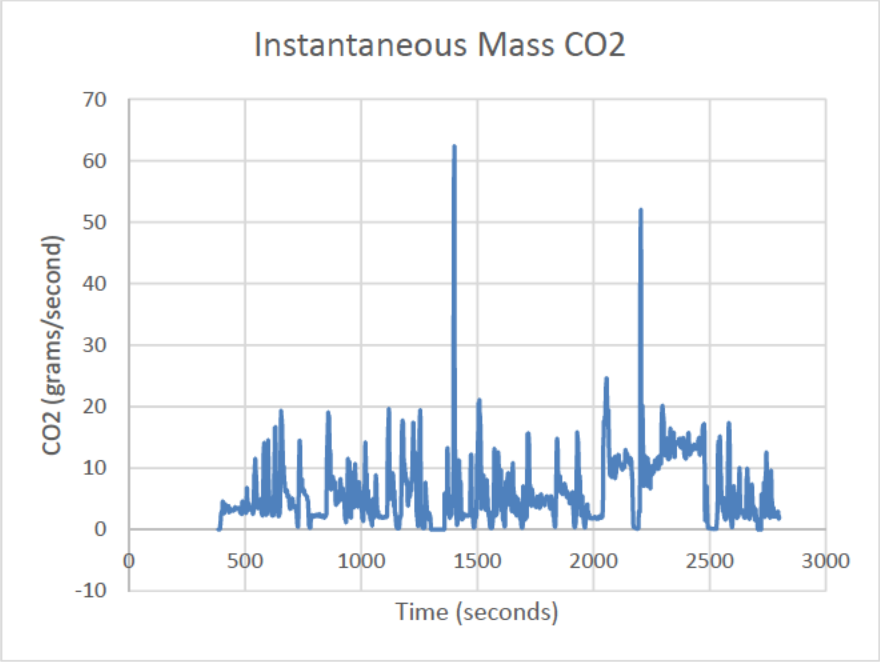


Figure 14.3.1: Vehicle 14 – Transient Cycle Instantaneous Mass CO_2

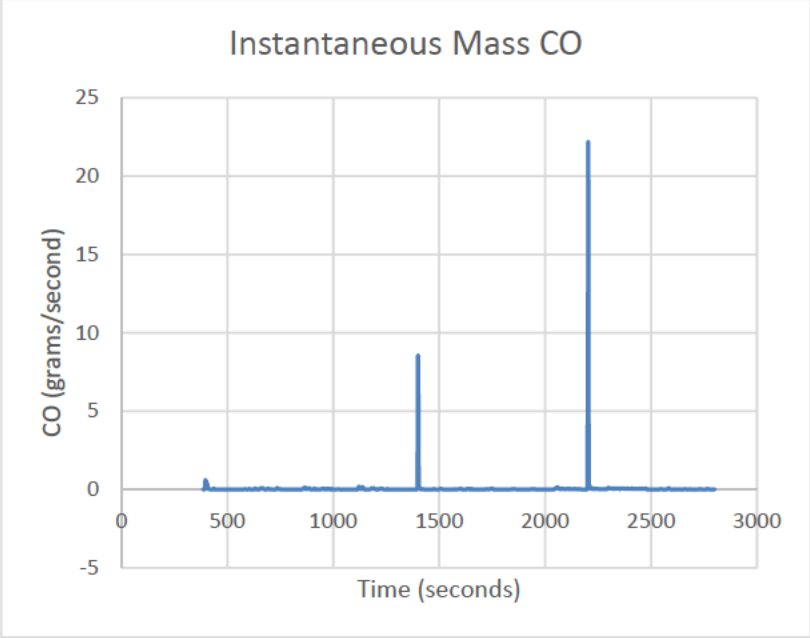


Figure 14.3.2: Vehicle 14 – Transient Cycle Instantaneous Mass CO

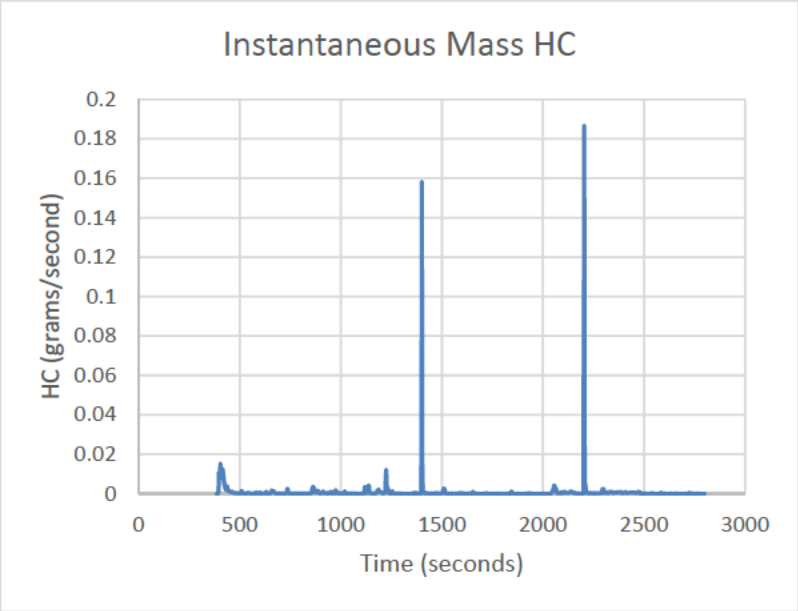


Figure 14.3.3: Vehicle 14 – Transient Cycle Instantaneous Mass HC

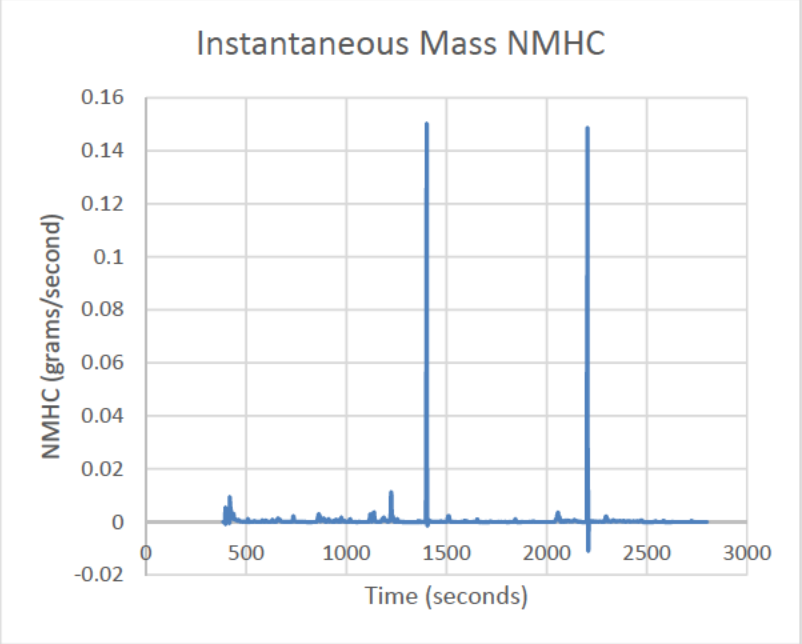


Figure 14.3.4: Vehicle 14 – Transient Cycle Instantaneous Mass NMHC

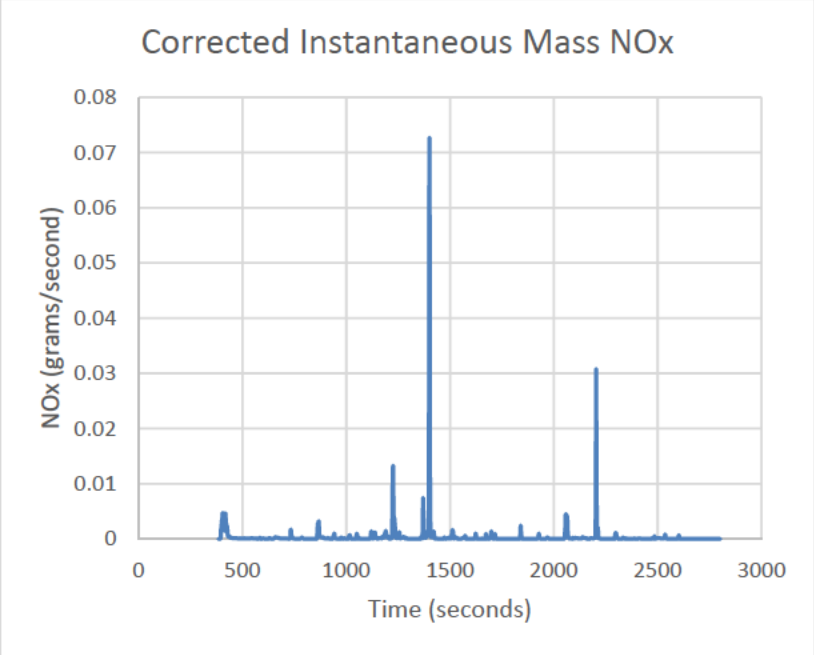


Figure 14.3.5: Vehicle 14 – Transient Cycle Instantaneous Mass NOx

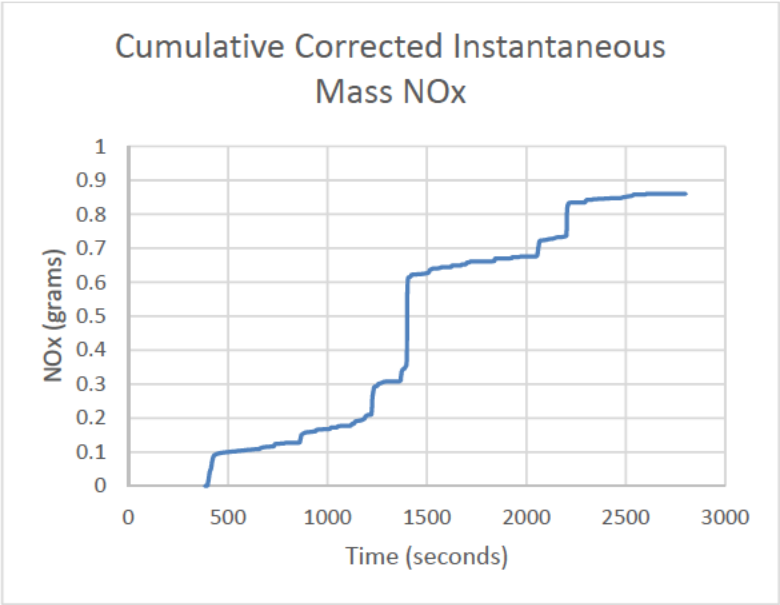


Figure 14.3.6: Vehicle 14 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

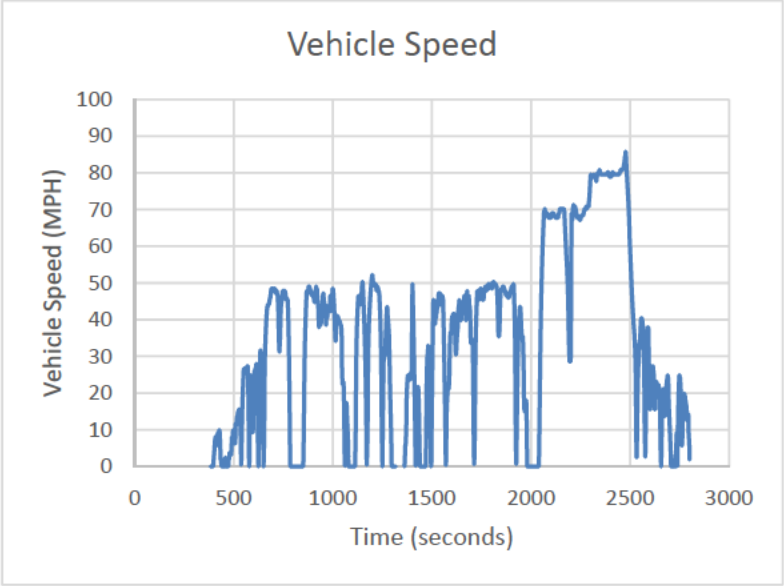


Figure 14.3.7: Vehicle 14 – Transient Cycle Vehicle Speed