IUMPR On-Vehicle Test Plan

Date: Tuesday, June 6th 2017
Location: Navistar Test Track – New Carlisle, IN
Time: 11:00 am – 2:30 pm, EDT

Test Resources

Vehicles: 4 trucks (30 minutes of track time for each)
- 2 Navistar: V1 and V2 (different ECM configurations)
- 2 Cummins: V3 and V4

Data logging devices (laptops, engine tools, USB drives):
- Solid Design provides two laptops
- Navistar provides one laptop
- Eric will provide an engine tool for Cummins
- Solid Design to provide 2 Navistar engine tools
- Three high capacity USB drives for data collection – at the end of the day, Solid Design will take two copies with data from all tests, Navistar will take one
- Three stopwatches/timers

Human Resources (4): WEAR SAFETY SHOES IF YOU HAVE THEM!
- 1 technician
- Eric Swenson
- Matt Gumbel
- Joe Kartje

Plan constraints:

- Three and a half hours of total test time
- 30 minutes of track time for each vehicle
- Three data collection teams (one driving, two stationary)
- 12 to 20 minutes for each trial (i.e., three to five trials per hour per team)
- Time to marshal collected data (allow a couple of minutes)
- Some trials may not have sufficient time to complete (i.e., “all green panel”)
- One Cummins engine tool (can’t run tests on V3 and V4 in parallel)

Planning activities to be completed before test day:
- Determine file naming method and directory structure for CAN logs
- Prepare a script for each trial on each vehicle (to maximize the number of trials and amount of data collected).

For each run:
- Collect and save a log of the CAN data on laptop/USB drive for post event analysis.

- Copy the IUMPR output file for previous run to a new name for the next run (to allow duplication of trial in the event of a failure during the next run)
- Be prepared to tolerate engine and vehicle faults
- At the end of the day, copy all the data collected onto a Navistar shared drive.

Schedule:

Time Slot	Navistar1 (Eric)	Navistar2 (Joe)	Cummins1 (Matt)	Cummins2 (Matt)
11:00-11:15	Set Up (get V1 on track)			
11:15-11:30	On Track Test 1 (V1-D1)	Stationary Test 1 (V2-S1)	Not being tested	Stationary Test 1 (V4-S1)
11:30-11:45	On Track Test 2 (V1-D2)	Stationary Test 2 and 3 (V2-S2, V2-S3)	Not being tested	Stationary Test 2 and 3 (V4-S2, V4-S3)
11:45-12:00	V1 off track	V2 on track	Not being tested	Stationary Test 4 (V4-S4)
12:00-12:15	Stationary Test 1 (V1-S1)	On Track Test 1 (V2-D1)	Stationary Test 1 (V3-S1)	Not being tested
12:15-12:30	Stationary Test 2 and 3 (V1-S2, V1-S3)	On Track Test 2 (V1-D2)	Stationary Test 2 and 3 (V3-S2, V3-S3)	Not being tested
12:30-12:45	Stationary Test 4 (V1-S4)	V2 off track	Stationary Test 4 (V3-S4)	Not being tested
12:45-1:00	Stationary Test 5 (V1-S5)	Stationary Test 4 (V2-S4)	V3 on track	Not being tested
1:00-1:15	Stationary Test 6 (V1-S6)	Stationary Test 5 (V2-S5)	On Track Test 1 (V3-D1)	Not being tested
1:15-1:30	Stationary Test 7 (V1-S7)	Stationary Test 6 (V2-S6)	On Track Test 2 (V3-D2)	Not being tested
1:30-1:45	Stationary Test 8 (V1-S8)	Stationary Test 7 (V2-S7)	V3 off track	V4 on track
1:45-2:00	Stationary Test 9 (V1-S9)	Stationary Test 8 (V2-S8)	Not being tested	On Track Test 1 (V4-D1)
2:00-2:15	Stationary Test 10 (V1-S10)	Stationary Test 9 (V2-S9)	Not being tested	On Track Test 2 (V4-D2)
2:15-2:30	Wrap Up (V4 off track)			

Function Legend for Stationary and Driving Tests

A: File management (select new or existing file) – Key on

B: Capture Vehicle Data Plate – Key on or engine running
C: Track Monitor Completion Status – Engine running
E: Collect Test Results – Key on or engine running

Stationary Tests

V*x*-S1 (all vehicles) – ABC (5 minutes @ idle, 5 minutes @ 1150 rpm, 2 minutes @ idle) E (NEW file)
Key ON
Start IUMPR application
Select Adapter
[A] Select File NEW – V*x*-S1 (where *x* is vehicle number: 1-4)
Read Vehicle Info
Start Engine
[B] Generate Vehicle Data Plate
[C] Track Monitor Completion Status – 5 minutes @ idle
Increase engine speed to 1150 rpm – 5 minutes @ 1150 rpm
Return to idle – 2 minutes @ idle
[E] Collect Test Results
Stop data collection
Close IUMPR application
Key OFF
Copy the output file V*x*-S1 to a new name (V*x*-S1-prev) for the next run

V1-S2 – mismatched VIN – Navistar1, Cummins1
[A] Select V3-S1 (file from V3) as report file.
Note application results.

V2-S2 – mismatched VIN – Navistar2, Cummins2
[A] Select V4-S1 (file from V4) as report file.
Note application results.

V3-S2 – mismatched VIN – Cummins1, Navistar1
[A] Select V1-S1 (file from V1) as report file.
Note application results.

V4-S2 – mismatched VIN – Cummins2, Navistar2
[A] Select V2-S1 (file from V2) as report file.
Note application results.

Vx-S3 (all vehicles) – ABC (NEW file)
Key ON
Start IUMPR application
Select Adapter
[A] Select NEW – V*x*-S3 (where *x* is vehicle number: 1-4)
Read Vehicle Info
Start Engine (idle)
[B] Generate Vehicle Data Plate
[C] Track Monitor Completion Status – 15 seconds @ idle

Stop data collection
Close IUMPR application
Copy the output file V*x*-S3 to a new name (V*x*-S3-prev) for the next run

Vx-S4 (all vehicles) – ABC, ABC, ABCE (existing file)
Key ON
Start IUMPR application
Select Adapter
[A] Select File Existing – V*x*-S3 (where *x* is vehicle number: 1-4)
Read Vehicle Info
Start Engine (idle)
[B] Generate Vehicle Data Plate
[C]Track Monitor Completion Status – 15 seconds @ idle
Stop data collection
Close IUMPR application
Start IUMPR application
Select Adapter
[A] Select File Existing – V*x*-S3 (where *x* is vehicle number: 1-4)
Read Vehicle Info
Start Engine (idle)
[B] Generate Vehicle Data Plate
[C] Track Monitor Completion Status – 15 seconds @ idle
Stop data collection
Close IUMPR application
Start IUMPR application
Select Adapter
[A] Select File Existing – V*x*-S3 (where *x* is vehicle number: 1-4)
Read Vehicle Info
Start Engine (idle)
[B] Generate Vehicle Data Plate
[C] Track Monitor Completion Status – 15 seconds @ idle
[E] Collect Test Results
Stop data collection
Close IUMPR application
Engine OFF
Copy the output file *Vx*-S3 to a new name (V*x*-S4-prev) for the next run

V1-S5 – mismatched VIN – Navistar1, Navistar2
[A] Select V2-S1 (file from V2) as report file.
Note application results.

V2-S5 – mismatched VIN – Navistar2, Navistar1
[A] Select V1-S1 (file from V1) as report file.
Note application results.

Vx-S6 (vehicles V1 and V2) – ABC (5 minutes @ idle, 5 minutes @ 1150 rpm, 2 minutes @ idle) (NEW file)
Key ON
Start IUMPR application

Select Adapter
[A] Select File NEW – Vx-S6 (where *x* is vehicle number: 1-2)
Read Vehicle Info
Start Engine
[B] Generate Vehicle Data Plate
[C] Track Monitor Completion Status – 5 minutes @ idle
Increase engine speed to 1150 rpm – 5 minutes @ 1150 rpm
Return to idle – 2 minutes @ idle
Stop data collection
Close IUMPR application
Key OFF
Copy the output file Vx-S6 to a new name (V*x*-S6-prev) for the next run

Vx-S7 (vehicles V1 and V2) – ABC, ABE (existing file)
Key ON
Start IUMPR application
Select Adapter
[A] Select File existing – Vx-S6 (where *x* is vehicle number: 1-2)
Read Vehicle Info
Start Engine
[B] Generate Vehicle Data Plate
[C] Track Monitor Completion Status – 5 minutes @ idle
Stop data collection
Close IUMPR application
Start IUMPR application
Select Adapter
[A] Select File existing – Vx-S6 (where *x* is vehicle number: 1-2)
Read Vehicle Info
[B] Generate Vehicle Data Plate
[E] Collect Test Results
Stop data collection
Close IUMPR application
Key OFF
Copy the output file Vx-S6 to a new name (V*x*-S7-prev) for the next run

Vx-S8 (vehicles V1 and V2) – Engine stops communicating (NEW file)
Key ON
Start IUMPR application
Select Adapter
[A] Select File existing – Vx-S8 (where *x* is vehicle number: 1-2)
Read Vehicle Info
Start Engine
[B] Generate Vehicle Data Plate
[C] Track Monitor Completion Status – 5 minutes @ idle
Key OFF
Stop data collection
Close IUMPR application
Copy the output file to a new name (V*x*-S8-prev) for the next run

Vx-S9 (vehicles V1 and V2) – Start engine during data collection (NEW file)
Start IUMPR application
Select Adapter
[A] Select File existing – Vx-S9 (where *x* is vehicle number: 1-2)
Read Vehicle Info
Key ON
Read Vehicle Info (again)
[B] Generate Vehicle Data Plate
[C] Track Monitor Completion Status
Note application response.
Start Engine
[C] Track Monitor Completion Status
[E] Collect Test Results
Stop data collection
Close IUMPR application
Key OFF
Copy the output file to a new name (V*x*-S9-prev) for the next run

V1-S10 (vehicle V1 only) – AB, ABC, ABE (NEW file)
Key ON
Start IUMPR application
Select Adapter
[A] Select File NEW – V1-S10
Read Vehicle Info
Start Engine (idle)
[B] Generate Vehicle Data Plate
Stop data collection
Close IUMPR application
Start IUMPR application
Select Adapter
[A] Select File Existing – V1-S10
Read Vehicle Info
Start Engine (idle)
[B] Generate Vehicle Data Plate
[C] Track Monitor Completion Status – 15 seconds @ idle
Stop data collection
Close IUMPR application
Start IUMPR application
Select Adapter
[A] Select File Existing – V1-S10
Read Vehicle Info
Start Engine (idle)
[B] Generate Vehicle Data Plate
[E] Collect Test Results
Stop data collection
Close IUMPR application
Engine OFF
Copy the output file to a new name (V1-S10-prev) for the next run

Driving Tests
[Technician to do the driving with Eric, Matt, or Joe in the passenger seat. Eric to get advice on drive cycles to maximize changes to numerators.]

D1 (COLD CYCE – all vehicles) – ABC [need drive cycle guidance] E (existing file)
Key ON
Start IUMPR application
Select Adapter
[A] Select File existing – Vx-D1 (where *x* is vehicle number: 1-4)
Read Vehicle Info
Start Engine and Drive
[B] Generate Vehicle Data Plate
[need drive cycle guidance]
[C] Track Monitor Completion Status
[E] Collect Test Results
Stop data collection
Close IUMPR application
Key OFF
Copy the output file to a new name (Vx-D1-prev) for the next run

D2 (HOT CYCE – all vehicles) – ABC [need drive cycle guidance] E (NEW file)
Key ON
Start IUMPR application
Select Adapter
[A] Select File eixsting – Vx-S1 (where *x* is vehicle number: 1-4)
Read Vehicle Info
Start Engine and Drive
[B] Generate Vehicle Data Plate
[need drive cycle guidance]
[C] Track Monitor Completion Status
[E] Collect Test Results
Stop data collection
Close IUMPR application
Key OFF
Copy the output file to a new name (Vx-D2-prev) for the next run

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Appendix (notes):

The Federal emissions test is two ten minute sessions. A cold cycle followed by a hot cycle. All the monitors are supposed to run. It is understood that monitors related to the DPF will not run in twenty minutes.

Engine needs to be operated to satisfy the following timers. Current timer values and minimums are:

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Engine Idle Time:              165 s (3 mins)  minimum:     30 s
Engine Above 1150 rpm:         310 s (5 mins)  minimum:    300 s
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Engine Run Time since Start: 590 s (10 mins) minimum: 600 s