Michael Roeth
Executive Director
P.O. Box 15935
Fort Wayne, IN 46885

August 31, 2011

Matt Caldwell
Account Director
Jackson Marketing Group
2 Task Industrial Court
Greenville, SC 29607

Dear Matt:

Thank you for allowing us to support the recently completed 5,000 mile real world fuel economy test that you conducted for Michelin N.A. The North American Council for Freight Efficiency is working to fulfill our mission to help double the efficiency of North American goods movement and this project allowed us to help Michelin with their development and promotion of fuel saving and freight efficiency improving tires.

The following is our report on the test as an independent third party organization witnessing and validating the processes used to ensure an unbiased test of the various tire configurations.

Please contact me at mike.roeth@nacfe.org or 260.750.0106 to discuss any details of the report or to answer any questions. Thanks for engaging us and we look forward to supporting additional projects such as this one in the future.

Sincerely,

Michael Roeth, Executive Director
mike.roeth@nacfe.org
www.nacfe.org

cc: Don Baldwin, Michelin NA
Bob Walker, Michelin NA
Emmanuel Ayoola, Michelin NA

Summary

The North American Council for Freight Efficiency was engaged to validate that the 5,000 Mile Fuel Challenge test conducted by Jackson Marketing for Michelin NA in late July 2011. The responsibility of the NACFE was to confirm that the test was run to the prescribed protocol and that the results are directionally accurate for the fuel performance of the various tire configurations. The following report discusses the scope of the test, the test protocol, how the team executed the protocol and the results delivered over each and all segments of the test. The test was conducted per the identified test protocol and the results are shown in this report. Comments, such as noting weather conditions, any truck operating issues, etc. are included in the appendix.

5,000 Mile Fuel Challenge test scope

Jackson Marketing and Michelin NA designed the scope of this test. The scope and execution is described below.

- Multiple tractors and trailers will be involved and procured with identical specifications. Particular test components, drivers and trailers will be switched during the various segments at identified stops along the way.
    - Identical Old Dominion 2011 model year Freightliner daycabs with DD15 engines and Wabash Trailers were used for the test and rotation of drivers, tires, etc. conducted throughout the experiment.
- One-day tests run from Greenville, SC to Charleston, SC and back.
    - This test was completed on July 8th.
- Approximately 400 miles will be driven per day, yielding six days to LA, maybe a day of rest and six back.
    - Completed and noted. Segments 6 & 7 used different routes as noted.
- Fuel consumption measurements will be determined at each fueling stop and analyzed. Anomalies will be discussed along the way.
    - Completed and noted.
- The test will conclude upon the return to Greenville.
- The scope is very similar to a 3,000 mile test conducted in February 2010, which we have reviewed prior to this proposal.

The Test Protocol

The protocol for the fuel economy test was set by Jackson Marketing and Michelin and was delivered to the NACFE as a tab on the Fuel Challenge spreadsheet.

NACFE Approach to Validation

The NACFE engaged Mr. Mike Modrak of Performance Transportation Corporation to help in the validation of the test. Mike witnessed the key preparation details of the trucks, rode in the shakedown test on Friday, July 8th, witnessed all critical operations during the 12 segments and issued nightly reports for fuel economy tracking and comments for each segment. Mike also helped with the various problem solving issues during the test. These included such items as setting cruise control to achieve 62 mpg, wheel lug nuts coming loose, running out of DEF, etc. Mike Roeth flew to El Paso, TX and rode with the trucks from El Paso to Abilene on Thursday, July 21st. He reviewed and validated the procedures being followed and the auditing process of Mike Modrak.

NACFE Validation

The key test protocol elements and how the NACFE validated each are described in the chart below. Mike Modrak either rode with the trucks or in one of the chase vehicles during all segments. He witnessed all key measurement processes such as fueling, weighing, truck routing, etc. Mike and all three drivers used hand held radios to constantly manage to the test protocol including routes to take at stops, idle shutdowns, etc. He documented weather conditions, including ambient air temperatures, vehicle issues and other items of note shown in the comments report provided in the appendix. Mike Roeth, as noted above, rode along on one segment and was able to ensure the following to the test protocol as identified below.

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Procedures and Protocol	Verification by the NACFE
Alignment	
All trucks and trailers to be aligned Hunter computerized alignment equipment prior to	Mike M confirmed the alignment of all 3 trucks (Pics 1-3)
Computer print-outs to be provided to JMG by LPG. Documents will be scanned and saved on JMG server.	
Ambient Air Temperature	
Ambient air temperature should be captured each morning at departure.	Temperature identified and reported by Mike M each morning (Pic 4)
Emergency Road Service	
If a tire failure occurs, each truck is equipped with a spare tire for each wheel position.	Lug nuts came loose on one wheel end on a dolley during segment 4. Actions taken are described in the comments report.
If a tire change occurs, the mileage of that truck should be noted.	
If service is needed, please call 1-800-TIRE-911	
Fueling	
Trucks should be fueled at the end of each segment. Fuel (in gallons) should be captured in the "tracking" tab of this excel file.	Trucks were fueled at the end of each segment.
Trucks should be fueled on the same pump.	
Trucks should park in the same stop to be fueled. This should be accomplished by placing a mark on the ground when fueling 1st truck and others fueling in same position.	When the first truck fueled a mark was made at the front tire position and then the others fueled at the same spot (Pic 5 & 6). Drivers added fuel to each of the tanks. (Pic 7)
Trucks to be determined as "full" when fuel level reaches the bottom of the filler neck of	Mike Modrak determined when each tank was full (Pic 8)
Fuel receipts will be used to capture fueling data. JMG to handle receipts.	Fuel receipts were obtained by Dave of Jackson.
Fuel receipts to be scanned and saved on JMG server.	
Drivers to use Michelin DOT when fueling.	
Load	
Load (water toes) to be secured with load bars.	Mike M verified load in each trailer.
Spare tires to be secure with loading straps.	
Log Books	
Driver will keep DOT conplient log books throughout the trip.	Mike Modrak verified each driver completed their logs.
Copies of log books to be provided to JMG, scanned and saved on JMG server.	
Start-up and Shut-off	
The drivers need to coordinate the start-up and shut-off of the trucks to keep run time as equal as possible.	Drivers managed all starts and stops by walkie talkie. This included idling at the same rpm. Mike M and Mike R verified.
Tire Pressure	
Tire pressure should be check and adjusted if necessary every morning before departure.	Pre trip inspections occurred each morning (Pic 9)
Tire pressure for all wheel positions is to be 100 psi.	Tire pressure checked and set at 100 psi each morning (Pic 10)
Tire pressure is to be checked with a calibrated air gauge (3 provided by LPG).	
Tire gauges to stay with the tire configuration to which are assigned (see tire configuration	
All tires should carry valve caps.	
Tires to be aired to 105 each night after tire changes.	
Travel Distance	
The trucks should make ever attempt possible to keep their routes as close as possible.	Routes were kept as close as possible, utilizing the same route even during rest side stops. (Pic 11)
The trucks will travel with approximately 2 truck lengths of separation between each.	
Travel Speed	
Travel speed for this test is to 62 mph.	Speed was kept consistently throughout the trip at 62 mph.
Travel Order of Trucks	
Travel order of the trucks is defined for each segment in the "matrix" tab of this	Order was conducted per the protocol per Mike M.
Travel order should be captured daily in the "tracking" tab of this excel document.	
Truck Environment	
The drivers need to coordinate the driving environment inside of their trucks.	Verified by Mike M and Mike R.
Heat or AC should be at the same level in all trucks.	
Windows should be at the same level in all trucks.	
Head lights should be run at all times in all trucks.	
V-Boxes	Mike M and Mike R verified the use of data collection devices managed by Bob Walker of Michelin.
V-boxes will be installed on each truck to capture data during each segment	
Data to be uploaded each night to JMG's FTP site by LPG.	
Weighing	
Trucks should be weighed at the end of each segment after fueling. Weight should be captured in the "tracking" tab of this excel file.	Tractor trailers were weighed at each fuel stop. (Pic 12)

Picture 1 – Truck A

Picture 2 – Truck B

Picture 3 – Truck C

Picture 4 – El Paso morning

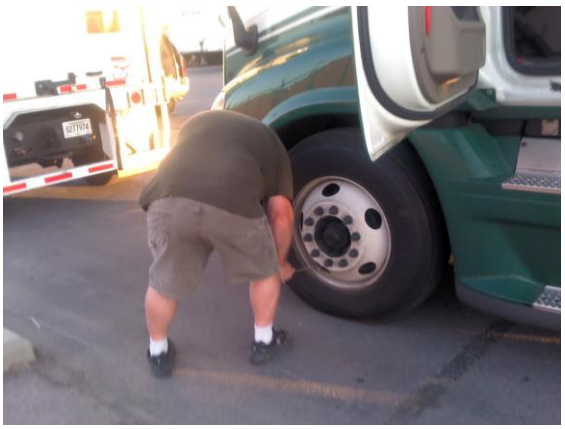
Picture 5 – Nightly Fueling

Picture 6 – Fuel Mark

Picture 7 – Filling Each Tank

Picture 8 – Mike Verifying Fill

Picture 9 – Pre-Trip Inspection



Picture 10 – Checking Air

Picture 11 – Typical Stop

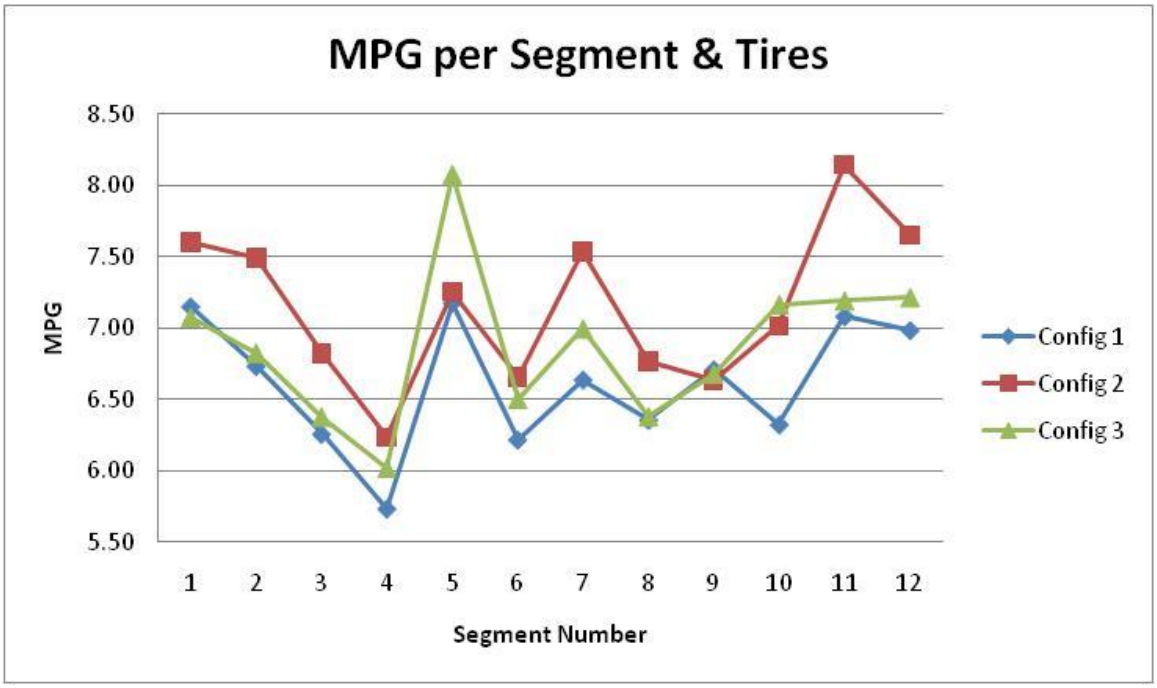
Picture 12 - Weighing

Results

As stated above, Mike Modrak recorded the fuel used and miles travelled for each truck and each segment throughout the entire test. Nightly, Mike M would complete the tracking tab of the aforementioned Fuel Challenge spreadsheet, provided by Jackson, and email it to the team; Bob Walker, Mike Roeth, Matt Caldwell, Steve Virosteck and Dave Daisher. Mike Roeth has completed a high level analysis of this data and it is provided in the appendix.

Generally, the configuration 2 tires performed the best for fuel, followed by configuration 3 and finally configuration 1. For all 12 segments, the average fuel economy of configuration 1 was 6.61 mpg, 7.15 for 2 and 6.87 for 3. Using configuration 1 as a baseline, configuration 2 on average performed 8.13% better and configuration 3, 3.93% better.

One anomaly in the data is present with the results of segment number 5, where configuration 3 performed extraordinarily well at 8.08 mpg. This is about 17.5% better than the average for this configuration of tires over all 12 segments. Detailed documentation, such as verifying the fuel receipts to Mike's notes, should be investigated to determine accuracy of the data for this segment. For discussion, if this segment's data is eliminated, the % higher fuel economy for configuration 2 and 3 are 8.83% and 3.08%, respectively.



Mike Roeth travelled to Greenville, SC on Thursday, August 11th, for a wrap up meeting of this test. In attendance were; Don Baldwin, Bob Walker, Emmanuel Ayoola, Matt Caldwell, Doug Jones and Mike Roeth. During the meeting, all fuel and weight tickets were double checked against the Fuel Challenge Spreadsheet. One change was made to the fuel gallons during segment 2 and this change has been incorporated in the file sent to the NACFE from Emmanuel on August 12 and noted as the corrected matrix. This data has been incorporated into this report.

Bob Walker will be leading a detailed investigation of all the data collected during the test. This includes vast amounts of information obtained with the V-boxes. This information can be significant in validating the results shown in this report and in the understanding of other affects on the fuel economy findings.

Conclusion

In conclusion, the North American Council for Freight Efficiency has validated that the team conducted this test per the protocol and that the results are accurate given the test procedure used.

Thank you for involving the NACFE on this project and we look forward to assisting this team on any future needs.

Michael Roeth, Executive Director, NACFE

Michael Modrak

Michael Modrak, Contractor to the NACFE and Technician at Performance Transportation

Appendix includes:

Mike Modrak's daily comments for each segment.
NACFE results analysis.