To: Charmley, William[charmley.william@epa.gov]; Spears, Matthew[spears.matthew@epa.gov]; Moulis, Charles[moulis.charles@epa.gov]; Orlin, David[Orlin.David@epa.gov]; Kataoka, Mark[Kataoka.Mark@epa.gov]
Cc: Hengst, Benjamin[Hengst.Benjamin@epa.gov]
From: Sutton, Tia
Sent: Tue 2/28/2017 9:20:19 PM
Subject: Letter from Rep. Loudermilk et al on trailers as new motor vehicles
EPA Response QFRs House Science June 22 2016 -final cleared 11-10-16.docx
Loudermilk et al HD P2 trailers.pdf

Hi all,

The attached pdf is a letter from Reps Loudermilk, Griffith, Cramer, Babin, Fortenberry, Westerman, Noem, Farenthold, and Yoho that will be coming our way shortly, on classifying trailers as new motor vehicles. The letter is similar to a QFR that Gina received from Rep. Loudermilk last year, but also seems to speak more to the legal authority piece – which is likely taken from the response that we sent to the QFR (the QFR final response is attached).

-Tia

To: Charmley, William[charmley.william@epa.gov]
Cc: Kylie Taylor[kylie.taylor@gladstein.org]
From: JoAnne Golden-Stewart
Sent: Fri 2/24/2017 5:19:31 PM
Subject: RE: Connecting you all for ACT Expo

Bill—

I hope you're doing well. I wanted to loop back around here as we are hoping to announce our full agenda lineup of speakers next week. Have you been able to identify someone on your side yet?

JoAnne Golden-Stewart

Senior Program Manager

Gladstein, Neandross & Associates
310.573.8551 direct

Ex. 6 - Personal Privacy cell

joanne.golden@gladstein.org

From: JoAnne Golden-Stewart
Sent: Wednesday, February 15, 2017 10:37 AM
To: Charmley, William <charmley.william@epa.gov>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: RE: Connecting you all for ACT Expo

Thanks, Rich Moving you to bcc so as to not clutter your inbox. Bill, we'd love to pick back up on the request to have someone join us for ACT from your team. As Rich indicated earlier, we have a couple of spots we'd love to secure someone for on both Wednesday, May 3, 2017 and Thursday, May 4, 2017. Do you have any suggestions on who would be good here? He said you were running it by a few folks, so I just wanted to loop back around.

As a reminder, the speaking spots are listed below.

May 3, 2017

8:30 a.m. - 10:45 a.m.

GENERAL SESSION

Medium- and Heavy-Duty General Session

9:45 a.m. - Focusing Freight on Efficiency

Building on the opening session, this panel will provide additional details on industry efficiency improvement projects and strategies, as well as insight into how these near-term efforts then connect to the longer-term evolution to truck platooning, automation and potentially driverless trucks. This session will start off by diving deeper into the EPA's Phase 2 GHG Rule to help fleet customers understand what this regulation will really mean to their future planning and procurement plans. Higher costs; increased vertical integration of truck, engine, and powertrain components; and fewer options from OEMs are expected. With implementation of the trailer standards set to take effect in 2018, and the truck and engines standards in 2021, hear from industry leaders on this session about what these new standards and rules mean to your fleet and future procurement costs and options. Beyond the EPA Phase 2 GHG Rule, get an update on the second round of SuperTruck funding. SuperTruck II projects will research, develop, and demonstrate technologies to improve heavy-truck freight efficiency by more than 100 percent, relative to a manufacturer's best-in-class 2009 truck, with an emphasis on technology cost-effectiveness and performance. Hear which OEMs are participating, what technologies they will be testing, and what goals they hope to achieve.

US EPA (invited)

Volvo (tentatively confirmed; awaiting speaker)

US DOE SuperTruck

NACFE (invited as a moderator)

May 4, 2017

9:00 a.m. - 11:45 a.m.

WORKSHOPS & FORUMS

Ultra Clean Heavy-Duty Vehicle Summit

The heavy-duty vehicle sector is at the dawn of a new era-one characterized by an array of zero emission technology. From full battery electric trucks, buses, and other equipment to hydrogen fuel cell trucks that can travel 1,200 miles, what will the future look like? Not to be left behind, ultra-low emission heavy-duty natural gas and propane autogas engines are here today, and many believe we will see diesel engines fight back in the coming years. Local, state, and federal regulators have noticed these advancements and

are charging ahead with low-NOx rule-making efforts at the national level and in California. Meanwhile, leading progressive fleets are making big investments in these zero and near zero emission technologies which, when combined with renewable fuels, can provide a heavy-duty vehicle platform that has virtually no emissions. Find out first-hand how the heavy-duty sector is poised to do a 180 and go from the largest source of regional criteria emissions and greenhouse gas emissions to a sector that contributes almost no harmful air emissions. Hear from leading stakeholders on these fast-paced developments in the market so that you understand what is real, what is happening, and when these products will be required and available.

Regulatory Landscape**:** Matt Spear, US EPA (invited)**;** CARB: invited SCAQMD: invited

Electric: **Andy Swanton, BYD (confirmed)**; Fuso; Trevor Milton, Nikola (confirmed); Michael Simon, Transpower (invitation made)

Gaseous Fuels**:** Joe Thompson Roush, CWI, eControls

Future of Diesel: CARB, Volvo

JoAnne Golden-Stewart

Senior Program Manager

Gladstein, Neandross & Associates
310.573.8551 direct

Ex. 6 - Personal Privacy cell

joanne.golden@gladstein.org

From: Rich Kassel
Sent: Monday, February 13, 2017 11:46 AM
To: Charmley, William <charmley.william@epa.gov>; JoAnne Golden-Stewart <joanne.golden@gladstein.org>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: Connecting you all for ACT Expo

Bill –

I don't recall whether I told you I was leaving GNA when we spoke on February 2 (it wasn't public yet), but I will be leaving Gladstein, Neandross & Associates (GNA) on Wednesday, February 15. It's been a great place to work for 4.5 years, but starting on February 27, I'll be joining Capalino+Company as an executive vice president, directing their new Environment, Energy, and Sustainability practice. (When I land there, I'll send you more details about what I'll be doing).

JoAnne Golden-Stewart, with assistance from Kylie Taylor, will be organizing the ACT Expo sessions that we discussed earlier this month. They will be your contact points for all things ACT Expo going forward, and are great to work with. I hope you get to ACT this year, and if you do, I'm sure you'll enjoy working with them.

Let's talk soon, but I wish you all the best in the meantime,

Rich

Rich Kassel

Senior Vice President
Gladstein, Neandross & Associates

5 Penn Plaza, 23rd Floor

New York, NY 10001

212.849.6861 direct

Ex. 6 - Personal Privacy cell

rich.kassel@gladstein.org

GLADSTEIN, NEANDROSS & ASSOCIATES

CLEAN TRANSPORTATION & ENERGY CONSULTANTS

High Horsepower "HHP" Summit | *October 11-13, 2016 – Chicago, IL*

Rethink Methane Symposium | *February 21-22, 2017 – Sacramento, CA*

Advanced Clean Transportation "ACT" Expo | *May 1-4, 2017 – Long Beach, CA*

This communication may contain material that is confidential or legally privileged. It is intended solely for the use of the intended recipient(s). Any interception, review, reliance, disclosure, distribution or forwarding by anyone other than the intended recipient and without express permission is strictly prohibited.

To: Hengst, Benjamin[Hengst.Benjamin@epa.gov]
Cc: Charmley, William[charmley.william@epa.gov]
From: Grundler, Christopher
Sent: Fri 3/31/2017 3:55:20 PM
Subject: Re: Truck GHG: executive order

Sigh.

Ex. 5 - Deliberative Process, Attorney Client, Attorney Work Product

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. Environmental Protection Agency
202/564-1682 (Washington DC)
734/214-4207 (Ann Arbor MI)

On Mar 31, 2017, at 11:25 AM, Hengst, Benjamin <Hengst.Benjamin@epa.gov> wrote:

Chris—read the whole chain below.

From: Orlin, David
Sent: Friday, March 31, 2017 11:25 AM
To: Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Charmley, William <charmley.william@epa.gov>
Cc: Kataoka, Mark <Kataoka.Mark@epa.gov>
Subject: RE: Truck GHG: executive order

Ex. 5 - Deliberative Process, Attorney Client, Attorney Work Product

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

From: Hengst, Benjamin
Sent: Friday, March 31, 2017 11:19 AM
To: Orlin, David <Orlin.David@epa.gov>; Charmley, William <charmley.william@epa.gov>
Subject: RE: Truck GHG: executive order

David—did you send this to Chris yet? If not, I will

From: Orlin, David
Sent: Friday, March 31, 2017 11:18 AM
To: Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Charmley, William <charmley.william@epa.gov>
Cc: Kataoka, Mark <Kataoka.Mark@epa.gov>
Subject: FW: Truck GHG: executive order

fyi

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

From: Orlin, David
Sent: Friday, March 31, 2017 11:17 AM
To: 'Chen, Sue (ENRD)' <Sue.Chen@usdoj.gov>; Kataoka, Mark <Kataoka.Mark@epa.gov>
Cc: Hostetler, Eric (ENRD) <Eric.Hostetler@usdoj.gov>; Srinivasan, Gautam <Srinivasan.Gautam@epa.gov>
Subject: RE: Truck GHG: executive order

Sue,

Ex. 5 - Deliberative Process, Attorney Client, Attorney Work Product

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

From: Chen, Sue (ENRD) [mailto:Sue.Chen@usdoj.gov]
Sent: Friday, March 31, 2017 10:41 AM
To: Kataoka, Mark <Kataoka.Mark@epa.gov>
Cc: Orlin, David <Orlin.David@epa.gov>; Hostetler, Eric (ENRD) <Eric.Hostetler@usdoj.gov>
Subject: Truck GHG: executive order

Mark,

Ex. 5 - Deliberative Process, Attorney Client, Attorney Work Product

Ex. 5 - Deliberative Process, Attorney Client, Attorney Work Product

Thanks,

Sue

Sue Chen

U.S. Department of Justice

Environment & Natural Resources Division

Environmental Defense Section

P.O. Box 7611

Washington, D.C. 20044

202.305.0283

Sue.Chen@usdoj.gov

To: Bunker, Byron[bunker.byron@epa.gov]; Charmley, William[charmley.william@epa.gov]; Simon, Karl[Simon.Karl@epa.gov]
From: Haugen, David
Sent: Thur 3/30/2017 4:14:04 PM
Subject: FW: DD Working Meeting - Wed. 3/22 11:00 am
OTAQ Division Request By Tier V2.xlsx

From: Haley, Mike
Sent: Wednesday, March 22, 2017 10:58 AM
To: Charmley, William <charmley.william@epa.gov>; Bunker, Byron <bunker.byron@epa.gov>; Haugen, David <haugen.david@epa.gov>; Simon, Karl <Simon.Karl@epa.gov>
Cc: Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Cook, Leila <cook.leila@epa.gov>; Bradish, Tracey <bradish.tracey@epa.gov>
Subject: RE: DD Working Meeting - Wed. 3/22 11:00 am

Attached is the summary spreadsheet that captures everyone's submissions.

From: Haley, Mike
Sent: Tuesday, March 21, 2017 4:26 PM
To: 'William Charmley' <Charmley.William@epa.gov>; Byron Bunker <Bunker.Byron@epa.gov>; David Haugen <Haugen.David@epa.gov>; Karl Simon <Simon.Karl@epa.gov>
Cc: Benjamin Hengst <Hengst.Benjamin@epa.gov>; Cook, Leila <cook.leila@epa.gov>; Tracey Bradish <Bradish.Tracey@epa.gov>
Subject: DD Working Meeting - Wed. 3/22 11:00 am

All –

Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

If anyone wants to volunteer to be first up for discussion, just let the group know. If no volunteers, then I'm going to randomly suggest that the order of discussion be:

TATD

CD

ASD

TCD

IO

To: Charmley, William[charmley.william@epa.gov]
Cc: Spears, Matthew[spears.matthew@epa.gov]
From: Simon, Joseph
Sent: Thur 3/30/2017 2:09:04 PM
Subject: RE: Would you please forward Bill our recent Loudermilk response?
AL-17-000-4973 Resp Ltr_tls2.docx

Bill and Matt,

I understand that Ben (Tia Sutton) has some edits to this letter.

Please see attached.

---joe

From: Simon, Joseph
Sent: Thursday, March 30, 2017 9:18 AM
To: Charmley, William <charmley.william@epa.gov>
Cc: Spears, Matthew <spears.matthew@epa.gov>
Subject: RE: Would you please forward Bill our recent Loudermilk response?

Hello Bill,

Here is our response letter that we submitted to DC.

Joe Simon

Senior Service America, Inc.

Supporting the USEPA through a Cooperative Agreement

under the Senior Environmental (SEE) Program

Assessment and Standards Division

Direct line 734-214-4835

Email: Simon.Joseph@epa.gov

From: Spears, Matthew
Sent: Thursday, March 30, 2017 9:12 AM
To: Simon, Joseph <Simon.Joseph@epa.gov>
Subject: Would you please forward Bill our recent Loudermilk response?

Hi Joe,

Would you please forward Bill our recent Loudermilk response?

Thanks,

Matthew Spears

Center Director, Heavy-Duty Diesel Standards

U.S. Environmental Protection Agency

2000 Traverwood Dr.

Ann Arbor, MI 48105

spears.matthew@epa.gov

w. 734-214-4921

m. 734-276-7079

Begin forwarded message:

From: "Charmley, William" <charmley.william@epa.gov>
Date: March 29, 2017 at 16:53:32 EDT
To: "Spears, Matthew" <spears.matthew@epa.gov>, "Moulis, Charles" <moulis.charles@epa.gov>
Subject: RE: For Bill's review: Response to Sen Loudermilk re: trailers **with NHTSA input**

Matt and Chuck –

Do you know what the status of this control is? Do you decide to include a few sentences on the previous heavy-duty NAS studies on trailers?

Thanks

Bill

From: Charmley, William
Sent: Monday, March 13, 2017 8:36 AM
To: Spears, Matthew <spears.matthew@epa.gov>; Moulis, Charles <moulis.charles@epa.gov>
Subject: RE: For Bill's review: Response to Sen Loudermilk re: trailers **with NHTSA input**

Matt and Chuck,

I think the draft response is good. I only had a few recommendations, which are shown in the attached.

Thanks

Bill

From: Spears, Matthew
Sent: Friday, March 10, 2017 10:00 AM

To: Charmley, William <charmley.william@epa.gov>
Subject: For Bill's review: Response to Sen Loudermilk re: trailers **with NHTSA input**

Hi Bill,

Jim Tamm replied to me today with some minor suggested edits to our draft response letter. I incorporated these edits in the attached updated draft.

Ex. 5 - Deliberative Process

Also, this morning Joe Simon and Chuck reminded me that we should be moving this response up the review chain because we are now past the due date. When do you think that you might be able to review and comment on the draft response? I can then request an appropriate time extension, thanks.

Regards,

Matthew Spears

Center Director, Heavy-Duty Diesel Standards U.S. Environmental Protection Agency

2000 Traverwood Dr.

Ann Arbor, MI 48105

spears.matthew@epa.gov

w. 734-214-4921

m. 734-276-7079

From: Tamm, James (NHTSA) [mailto:james.tamm@dot.gov]
Sent: Friday, March 10, 2017 8:35 AM
To: Spears, Matthew <spears.matthew@epa.gov>

Cc: Hagen, Ryan (NHTSA) <ryan.hagen@dot.gov>
Subject: RE: House Requests EPA Administrator RECONSIDER THE GREENHOUSE GAS PHASE 2 RULE'S EFFECTS ON TRUCK TRAILERS

Matt,

While we did respond to your separate memo and forwarded draft response letter, I wanted to assure we also responded to the additional points the memo below.

Ex. 5 - Deliberative Process

Jim

To: Simon, Karl[Simon.Karl@epa.gov]; Patulski, Meg[patulski.meg@epa.gov]; Moltzen, Michael[Moltzen.Michael@epa.gov]; Charmley, William[charmley.william@epa.gov]
From: Dickinson, David
Sent: Tue 3/28/2017 9:04:34 PM
Subject: Feedback from call with NACAA re CA Waivers and section 177 process
Over of section 209 for NACAA 3-24-17.ppt

All –

Attached are some slides that I used for general talking points on my call today – I did not share these slides or send them to anyone.

There were reps from RI, NH, MA, VT, CT, NJ, DE, MD, Tenn, VA, ozone transport comm, PA, NC, GA, Louisville, MI, WI, Missouri, NV, Placer County CA, OR, Puget Sound. Sounds like 40 or more lines were used.

No surprises and no discussion of the Midterm review. In response to a question I indicated that I

Ex. 5 - Deliberative Process

David

David Dickinson

202-343-9256

Dickinson.David@epa.gov

To: Charmley, William[charmley.william@epa.gov]
From: Sargeant, Kathryn
Sent: Fri 2/17/2017 9:11:22 PM
Subject: FW: DID you see this email from Mike Haley?: Follow Up/Next Step on Op Plan Process
IO FY 17 Budget Request010817.xlsx
16-17 CBOR report Expense_Travel__7680089.pdf
17-18 CBOR report Expense_Travel__7680089.pdf

Hi, Bill. I am obviously working on the MOVES-related questions you had for me related to this exercise, but as you see below, Tricia is apparently doing some things to help you/Ines respond. I'm not sure what your plans are and if you are expecting her to do this (or more)—so I'm forwarding so you can reach out to her if necessary.

From: Paff, Patricia
Sent: Friday, February 17, 2017 2:58 PM
To: Storhok, Ines <storhok.ines@epa.gov>
Cc: Sargeant, Kathryn <sargeant.kathryn@epa.gov>
Subject: DID you see this email from Mike Haley?: Follow Up/Next Step on Op Plan Process

Ines,

TGIF! I just wanted to make sure that you saw this exercise, it's due on Tuesday next week.

Ex. 5 - Deliberative Process

I'm working tomorrow til 1230 and possibly on Sunday if I can find a babysitter. I can also come in Monday if needed, my son will be on a field trip with his classmates all day.

I'm including Kathryn just in case you are out of pocket right now.

My cell is Ex. 6 - Personal Privacy

Trish

Ex. 5 - Deliberative Process

From: Haley, Mike
Sent: Wednesday, February 15, 2017 12:19 PM
To: Charmley, William <charmley.william@epa.gov>; Bunker, Byron <bunker.byron@epa.gov>; Haugen, David <haugen.david@epa.gov>; Simon, Karl <Simon.Karl@epa.gov>
Cc: Cook, Leila <cook.leila@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Bradish, Tracey <bradish.tracey@epa.gov>; Storhok, Ines <storhok.ines@epa.gov>
Subject: Follow Up/Next Step on Op Plan Process

All –

Just a quick follow up from yesterday's DD Working Group meeting to summarize what we agreed to as the next step in developing our FY17 Operating Plan.

Each Division will go back and associate each line of its current budget request with one of the three funding "Tiers" identified. These Tiers include:

Ex. 5 - Deliberative Process

Your revised input to include the "Tier" designations is requested by Noon, Tuesday, February 21.

QUESTIONS FOR THE RECORD
The Honorable Lamar Smith (R-TX)
U.S. House Committee on Science, Space, and Technology

Ensuring Sound Science at EPA

Monday, August 01, 2016

Questions for Administrator McCarthy

1. In testimony, EPA Administrator McCarthy said that the CARC report on glyphosate was "one step in the process" and that the issue is still "in review at the Agency." The CARC report found that "In accordance with the 2005 Guidelines for Carcinogen Risk Assessment, based on the weight-of evidence, glyphosate is classified as 'Not Likely to be Carcinogenic to Humans.'" This finding by CARC supports previous conclusions by the EPA that glyphosate is safe.

a. Why does the EPA feel that additional review beyond the CARC report is necessary?

A: The CARC document is one piece of information that the agency is using to inform the cancer classification for glyphosate. The agency is also receiving input from experts at the EPA and across the government, and will get further input from the peer-review process and public comment period.

The Cancer Assessment Review Committee (CARC) report was completed in October 2015 and reflects the panel's review of the existing cancer database for glyphosate at that point in time. The CARC report considered data identified by the International Agency for Research on Cancer (IARC) in its August 2015 monograph. Since then, EPA has been made aware of other existing glyphosate cancer studies submitted to the Joint FAO/WHO Meeting on Pesticide Residues (JMPR) and the European Food Safety Authority (EFSA) to which EPA previously did not have access. EPA is undertaking a comprehensive and thorough review of the cancer database for glyphosate and is currently evaluating the new information available, including data from over 170 epidemiological, animal, and genotoxicity studies not previously available to the agency.

b. Has anyone at the EPA raised concerns with the work of CARC or with their findings in regard to glyphosate?

A: EPA is working collaboratively with experts on the comprehensive review of the cancer database and the new information. The agency aims to ensure that the data and methodology used in its risk assessment reflects EPA's commitment to quality science.

c. What specific additional steps is the EPA planning on taking in its review of glyphosate?

A: EPA is in the process of rescheduling a meeting of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel (SAP) to consider and review EPA's Evaluation of the Carcinogenic Potential of Glyphosate. The meeting had been originally scheduled for mid-October 2016, but had to be postponed due to the availability of epidemiology experts. In September, the agency published for review discussion documents, which include the agency's proposed cancer classification, at https://www.epa.gov/sap/meeting-materials-october-18-21-2016-scientific-advisory-panel. After the meeting, the peer review panel will have 90 days to provide EPA with a written report. In spring 2017, once EPA has reviewed the report and made any necessary changes in its risk assessment, EPA expects to release all the components of its full human health and ecological risk assessments for a 60-day public comment period. Once public comments have been reviewed, EPA expects to publish a Proposed Interim Registration Review Decision that may detail specific risk mitigation measures for glyphosate, if needed. The Proposed Interim Registration Review Decision for glyphosate will be available for another 60-day public comment period. An Interim Registration Review Decision will be issued after public comments are considered.

2. The CARC report was dated October 1, 2015, marked final, and signed by all of its authors. Can you explain why the EPA sat on this report for over six months before it was "inadvertently" published online? When, if ever, was the EPA planning on making the CARC report public?

A: As a general practice, we do not publish individual components of risk assessments, for example a cancer assessment, until the entire risk assessment has been completed. In the case of glyphosate, questions were raised about the conclusions of the CARC report and so the EPA conducted a systematic review, to be reviewed by a FIFRA Scientific Advisory Panel, to ensure that our cancer assessment considered all relevant data and was transparent in its interpretations of the agency's cancer guidelines. The EPA posted the "Glyphosate Issue Paper: Evaluation of Carcinogenic Potential" and supporting materials, including the October 2015 CARC report, in September 2016 in preparation for the peer review meeting. In this case, since the agency is taking scientific analysis supporting the proposed cancer classification to a peer review, the relevant components were released ahead of the entire risk assessment. It is worth noting that even based on the more robust scientific dataset, the final conclusion of the September 2016 document did not change from the CARC report.

3. In April 2015, Carissa Cyran, the chemical review manager for the Office of Pesticide

Programs at EPA, told the news media "In a few months, EPA will be releasing for public comment our preliminary human health risk assessment for glyphosate as part of our research program to re-evaluate all pesticides periodically." Over a year later, the public is still waiting for the EPA's review of glyphosate. According to testimony given by EPA Administrator McCarthy, the Agency is now targeting fall 2016 for its release. Can you explain the reason for these on-going delays?

A: As explained previously, EPA originally intended to publish the glyphosate human health and ecological risk assessments for public comment in summer 2015. However, publication was delayed due to additional information and data that became available in 2015 and 2016 from various international organizations. EPA is in the process of reviewing the additional information prior to publication of its own risk assessment, which is currently scheduled for spring 2017.

4. According to Administrator McCarthy, Jesudosh "Jess" Rowland, Deputy Director, Office of Pesticide Programs, Health Effects Division, and lead author of the CARC report on glyphosate, retired from the agency in May 2016. This means that he retired shortly after the CARC report was published and then removed from the website.

a. When did Rowland make the EPA aware of his retirement?

A: He had been discussing retirement for about a year but officially announced it in February 2016.

b. Did Rowland retire on his own accord?

A: Yes.

c. Does Rowland's retirement have anything to do with the CARC report on glyphosate?

A: No.

5. CARC's report not only found that glyphosate is not likely to be carcinogenic, but was also critical of the International Agency for Research on Cancer (IARC) monograph on glyphosate. Two officials from the EPA, Mathew Martin and Peter Egeghy, participated in the IARC monograph on glyphosate.

a. Are there are internal conflicts or disagreements between EPA staff over CARC's review of glyphosate?

A: Questions were raised about the conclusions of the CARC report and so the EPA conducted a systematic review, to be reviewed by a FIFRA Scientific Advisory Panel, to ensure that our cancer assessment considered all relevant data and was transparent in its

interpretations of the agency's cancer guidelines. It is worth noting that even based on the more robust scientific dataset, the final conclusion of the September 2016 document did not change from the CARC report.

6. A letter dated August 31, 2015 from members of this Committee raised concerns that the ozone rule was based on a single study of only 31 individuals.
   a. Given the unreliability of such a small sample size of this study, what assurances can you give the American people that the costs this rule will impose on communities across the nation are grounded in a well-founded scientific basis?
   b. Were additional studies omitted from the decision making process that produced contrary results to the outcome of the rulemaking? If yes, which studies were specifically omitted?

A: The decision to set the level of the 2015 O3 NAAQS at 70 ppb was based on consideration of the full body of health evidence, including controlled human exposure and epidemiologic studies, quantitative analyses of ozone exposures and health risks, advice from CASAC, and public comments. The new evidence in this review includes controlled human exposure studies where healthy people are exposed to ozone under controlled conditions. These types of studies provide the strongest evidence about health effects associated with ozone, and several of these studies indicate the occurrence of respiratory effects following exposures to ozone concentrations below 75 ppb. The new studies considered are most fully described in the Integrated Science Assessment (http://www.epa.gov/isa/integrated-science-assessment-isa-ozone) and are summarized in the overview of the health effects evidence starting on page 65302 of the final rule (www.gpo.gov/fdsys/pkg/FR-2015-10-26/pdf/2015-26594.pdf). The EPA discussed its use of the results of controlled human exposure studies as part of the basis for the proposed decision starting on page 65317 of the final rule, responded to comments on the use of controlled human exposure studies in the section on the need for revision of the 2008 standard starting on page 65329 of the final rule, and responded to comments on the use of the controlled human exposure studies in the revisions to the level of the primary standard starting on page 65356 of the final rule.

7. In our recent committee hearing, Administrator McCarthy alluded to a "weight-of-evidence" approach generated from a "thousand" of studies conducted over decades. Can EPA provide references to the "thousands" of studies conducted on ozone that were taken into consideration for this "weight-of-evidence" approach?

A: The new studies that were considered are most fully described in the Integrated Science Assessment (http://www.epa.gov/isa/integrated-science-assessment-isa-ozone), and are summarized in the overview of the health effects evidence starting on page 65302 of the 2015 final National Ambient Air Quality Standards for ozone (www.gpo.gov/fdsys/pkg/FR-2015-10-26/pdf/2015-26594.pdf).

House Science, Space, and Technology Committee
Question for the Record to the U.S. Environmental Protection Agency
Congressman Barry Loudermilk (GA-11)

Dear Administrator McCarthy,

I am concerned that the Environmental Protection Agency's (Agency's) broad interpretation of its authority under the Clean Air Act would mean that the Agency believes it can define virtually anything that is within a motor vehicle as constituting a motor vehicle in and of itself.

Throughout the July 13, 2015 Notice of Proposed Rulemaking regarding Greenhouse Gas Phase 2, the Agency relies extensively on its Clean Air Act Section 202 grant of general authority to regulate mobile source emissions as providing a grant of authority to specifically regulate "motor vehicles", which are defined in 42 USC 7550(b) ("The term 'motor vehicle' means any *self-propelled* vehicle designed for transporting persons or property on a street or highway.")

Under this definition, the plain meaning of 'motor vehicle' would logically appear to apply only to a vehicle that moves under its own motive power.

But when respondents questioned whether the Agency possesses Clean Air Act authority to regulate manufacturers of motor vehicle parts that that do not "self-propel" and do not even produce emissions, the agency in reply seems to teeter back and forth between an assertion that individual parts are individual "motor vehicles", while also arguing the sum of the respective parts in total are what create a "motor vehicle". At one point, the Agency argues that having "detachable parts does not mean that either of the parts is not a motor vehicle" (FR Vol. 80, No. 133, 40170). But saying what a thing does not mean fails to prove that the thing does actually mean what the Agency wishes to assert. In fact, it fails to prove that the individual parts are also individual "motor vehicles". If this was to be the case, then a single motor vehicle must be made up of multiple motor vehicles, a curious claim especially considering that some of those supposed motor vehicles are unable to actually self-propel as the definition requires.

The Agency then makes a sum of the parts claim, arguing that when the unit is eventually connected it becomes a "self-propelled vehicle" that meets the definition. In a footnote, the Agency mocks the idea of considering the individual pieces of equipment as individual pieces of equipment ("Indeed, an argument that a trailer is not a motor vehicle because, considered (artificially) as a separate piece of equipment it is not self-propelled, applies equally to the cab-chassis- the tractor. No entity has suggested that tractors are not motor vehicles; nor is such an argument plausible.") But the Agency has previously acknowledged that the individual parts manufacturers and dealers are not the individuals who will actually connect the detachable parts to create a self-propelled unit. (See FR, Vol. 76, No. 179, September 15, 2011 at 57115, "In general, the heavy-duty combination tractor industry consists of tractor manufacturers (which manufacture the tractor and purchase and install the engine) and trailer manufacturers. These manufacturers are usually not the same entity. We are not aware of any manufacturer that typically assembles both the finished truck and the trailer and introduces the combination into commerce for sale to a buyer… There are also large differences in the kinds of manufacturers involved with producing tractors and trailers.")

Elsewhere, EPA veers back to the individual parts argument, claiming that the parts of a "heavy duty vehicle" are "part of a 'motor vehicle.'" But, once again, proving a part is in fact a part does not seem to prove that it is also a "motor vehicle" in and of itself, especially if it is unable to self-propel.

The Agency then states that its definition of "motor vehicle" is consistent with its prior interpretation, suggesting a reasonably long and settled history on the matter. But to buttress its point, the Agency only provided one example of guidance, which dates back only one year despite a lengthy history of the Agency's Clean Air Act interpretation and enforcement. Additionally, the Agency claims that it has regulated other parts in other rulemakings and that those parts makers did not object- although non-objection does not prove the Agency possesses the authority it claims to possess. It simply proves that the objection was not previously raised. Finally, the Agency even relies on its own proposed definition under 40 CFR 1037.801 of "vehicle" to prove a point as though its own proposed regulatory interpretation constitutes a grant of legislative authority.

I am concerned that the Agency believes that there is little or no limit to its authority to interpret the Clean Air Act as it sees fit. Where does the Agency draw the line? Does a glass window constitute a "motor vehicle"? Does an individual axle constitute a "motor vehicle"? Does a turn signal constitute a "motor vehicle"? None of those parts are even detachable from the motor vehicle, but all are necessary to pull freight.

Does the Agency believe its authority is without limit regarding which individual parts will eventually go into a temporarily connected unit that the Agency can regulate as individual motor vehicles where each individual part is the same thing as is the sum of all the parts?

Thank you, and I look forward to your response.

A: The final standards for heavy-duty vehicles and engines (*81 FR 73478, October 25, 2016*) contain emission standards for trailers. The EPA explained that a trailer is an incomplete motor vehicle, and not just a motor vehicle part, and documented that the Clean Air Act provides standard-setting authority over incomplete motor vehicles. The EPA also disclaimed authority to regulate motor vehicle parts as motor vehicles, and specifically stated (in the first chapter of the Response to Comments document (https://www3.epa.gov/otaq/climate/documents/420r16901.pdf)) that tires are motor vehicle parts and hence not within the EPA's standard setting authority for motor vehicles. Thus, the EPA has not asserted authority to regulate individual motor vehicle parts as vehicles.

The preamble to the final rule (section I.F) addresses the question you raise as to where a line is to be drawn between motor vehicles (complete and incomplete) and motor vehicle parts. Rather than paraphrase, here is what the EPA said with regard to that issue:

"EPA thus can set standards for all or just a portion of the motor vehicle notwithstanding that an incomplete motor vehicle may not yet be self-propelled. This is not to say that the Act authorizes emission standards for any part of a motor vehicle, however insignificant. Under the Act it is reasonable to consider both the significance of the components in comparison to the entire vehicle and the significance of the components for achieving emissions reductions. A vehicle that is complete except for an ignition switch can be subject to standards even though it is not self-propelled. Likewise, as just noted, vehicle components that are significant for controlling evaporative emissions can be subject to standards even though in isolation the components are not self-propelled. However, not every individual component of a complete vehicle can be subjected to standards as an incomplete vehicle. To reflect these considerations, EPA is adopting provisions stating that a trailer is a vehicle 'when it has a frame with one or more axles attached'..... EPA acknowledges that lines need to be drawn, but whether looking at the relation between the incomplete vehicle and the complete vehicle, or looking at the relation between the incomplete vehicle and the emissions control requirements, it is evident that trailers and glider kits should properly be treated as vehicles, albeit incomplete ones. They properly fall on the vehicle side of the line. When one finishes assembling a whole aggregation of parts to make a finished section of the vehicle (e.g. the trailer), that is sufficient. You have an entire, complete section made up of assembled parts. Everything needed to be a trailer is complete."

Committee on Science, Space & Technology

"Ensuring Sound Science at EPA"

Questions for the Record to:
The Honorable Gina McCarthy, Administrator, Environmental Protection Agency
Submitted by Ranking Member Eddie Bernice Johnson

1) When industry advocates come to Capitol Hill, the issue of regulatory certainty is routinely brought up. We often hear that a strong market signal allows for smart investment and risk management.

   - Can you discuss the importance of regulatory certainty and the value of a strong market signal to businesses?

   - Overall, what impact do you believe that EPA's current set of proposed regulations would have on the U.S. business community?

   - Would the recommendation by some that we place a moratorium on so-called "midnight regulations" increase or decrease regulatory certainty and private sector investments?

A: EPA also generally hears from industry a preference for regulatory certainty and the importance of understanding the requirements that will need to be met. History has shown that with regard to environmental regulations, industry has routinely been able to comply at a lower cost than was predicted. For example, in 1990, EPA estimated that the cost of compliance with Title IV of the Clean Air Act Amendments of 1990 would be as high as $5.9 billion a year. Three subsequent retrospective studies done by MIT, Resources for the Future, and Stanford University researchers, as detailed in the U.S. government's National Acid Precipitation Assessment Program (NAPAP) 2011 Report to Congress, all conclude the costs were less than half of EPA's estimate. The dramatic improvements in clean air from implementation of the Clean Air Act has also generated huge public health benefits. EPA estimates that air quality improvements led to 160,000 premature deaths averted each year and that total benefits from the Clean Air Act implementation exceeds costs by a factor of more than thirty to one. History shows us that it is possible to protect public health and the environment while maintaining a strong economy, and that remains true today.

Regulatory certainty provides industry with the signal to enable smart investment and risk management. For example, it is much easier to design-in compliance before a new facility is constructed. Even routine technology upgrades can be stifled if industry is uncertain about the regulatory requirements. A moratorium on EPA's proposed regulations could

substantially increase regulatory uncertainty, potentially chilling investment decisions. Finalizing EPA's currently proposed regulations would provide clarity to key industries. Conversely, the public health benefits of these rules as well as the related investments would not occur if the rules were to be delayed. For example, the final fuel economy standards for Heavy Duty trucks, announced jointly by EPA and the Department of Transportation on August 16, 2016, will reduce harmful carbon pollution and motivate truck manufacturers to invest in new technologies. Overall, the final standards are estimated to provide $230 billion in net benefits to society, including benefits to our climate and the public health of Americans. These benefits are estimated to outweigh costs by about an 8-to-1 ratio. Manufacturers all along the heavy duty value chain now have clarity about what will be required through FY 2027 and, especially with the flexibilities provided in the rule, can plan investment for their compliance strategies with real certainty.

2) Why is the Clean Power Plan a lawful exercise of EPA's authority under the Clean Air Act? What is the impact of any delays in its implementation?

A: On February 9, 2016, the Supreme Court stayed the Clean Power Plan (CPP) pending judicial review before the U.S. Court of Appeals for the D.C. Circuit and any subsequent proceedings in the Supreme Court. The EPA firmly believes the Clean Power Plan will be upheld when the courts address its merits because the Clean Power Plan rests on strong scientific and legal foundations. The stay means that no one has to comply with the Clean Power Plan while the stay is in effect. During the pendency of the stay, states are not required to submit anything to the EPA, and the EPA will not take any action to impose or enforce any such obligations. For example, the agency has clearly communicated to states that they are not required to make initial submittals on September 6, 2016.

Since the stay was issued, many states have said they intend to move forward voluntarily to continue to work to cut carbon pollution from power plants and are seeking the agency's guidance and assistance. The agency will be providing such assistance, which is not precluded by the stay. In particular, they have asked us to move forward with our outreach and to continue providing support and developing tools, including the Clean Energy Incentive Program (CEIP), the proposed model rules, and the proposed evaluation, measurement and verification (EM&V) guidance. For example, on April 28, 2016, a group of 14 state environmental agency officials wrote to the EPA to request that we provide a final model rule or rules, additional information on the Clean Energy Incentive Program, and other information and assistance. The EPA has received significant feedback on the CEIP and comment on the proposed model rules and EM&V guidance. The agency will move forward developing these actions in a way that is consistent with the stay while providing states the tools they have asked for to help address carbon pollution from power plants. For example, on June 16, 2016, the agency issued a proposed rule for public review

and comment that includes details about the optional Clean Energy Incentive Program. This will help guide states and tribes that choose to participate in the program when the Clean Power Plan becomes effective.

Addressing carbon pollution is a part of the EPA's obligations under the Clean Air Act. Further, the Clean Air Act directs the EPA to engage with states and other stakeholders and to provide technical and financial assistance on all aspects of air pollution prevention and control.

For the states that voluntarily continue work to cut carbon pollution from power plants and seek the agency's guidance and assistance, the EPA will continue to provide tools and support and technical assistance. The EPA also expects to continue to develop electronic systems to support state plan development activities, and other guidance, as appropriate, to support and respond to state needs. Such guidance may include information regarding evaluation, measurement, and verification of energy savings and emissions reductions.

3) There have been numerous claims that the Clean Power Plan alone will not significantly affect climate change. As we know, the Clean Power Plan is but one component of a larger national effort to reduce greenhouse gas emissions which is being carried out in conjunction with the regulatory actions taken by the rest of the world.

   - How does the Clean Power Plan fit into the national and global efforts to reduce greenhouse gas emissions?

   - Do you believe that the Administration's efforts to advance the Clean Power Plan were an important factor in securing the necessary global commitments to mitigate the impacts of climate change in Paris last year?

   - If the next Administration initiated the withdrawal of the Clean Power Plan rule without a significant replacement to address climate change, how might that impact this global agreement? How might it impact U.S. credibility in advancing other international environmental actions going forward?

A: The Clean Power Plan is only one component of a broad set of domestic actions this Administration has put in place or is in the process of putting in place to reduce GHG emissions. These include vehicle fuel economy standards, energy efficiency standards, methane-reducing regulations, restrictions on HFC uses, climate-friendly land management incentives, to name a few. These domestic actions collectively, combined with

similar measures in other major economies, contributed to the cooperative tone witnessed in Paris last December.

EPA firmly believes the Clean Power Plan will be upheld when the merits are considered because the rule rests on strong scientific and legal foundations. Regardless, Paris is a long-term global framework, unlike Copenhagen or Kyoto, with iterative rounds of targets every five years. When we sign up to Paris, it means we're in for the long haul. And the United States remains dedicated to phasing down our domestic emissions in keeping with our international commitments.

4) In previous hearings we have heard opponents of the Clean Power Plan cite increased electricity costs as an argument against the rule.

   - Can you please discuss the benefits consumers will likely see from improved energy efficiency standards?

   - Can you also discuss the important role energy efficiency will play in transitioning to a lower carbon economy?

A: In the CPP, EPA did not base the amount of emission reductions fossil fuel-fired power plants are required to achieve on demand-side energy efficiency (EE). However, sources and states may implement EE programs for compliance purposes, and EPA's analysis indicates that because those programs are generally the least cost means to comply, in fact, sources and states can be expected to implement them (see the Regulatory Impact Analysis for the CPP Final Rule: https://www.epa.gov/cleanpowerplan/clean-power-plan-final-rule-regulatory-impact-analysis). With energy efficiency as part of the suite of available compliance strategies, EPA analysis indicates average reductions in electricity bills are projected to be 7-8% in 2030. EE policies are currently used in all 50 states and are leading to significant CO_2 reductions from power plants. In 2015, EE program savings reported to the Energy Information Administration reduced U.S. electricity demand by 5% and the savings are growing at a rapid pace.

5) Some critics of the Clean Air Act have claimed that the EPA does not have authority to regulate carbon dioxide emission from power plants under section 111(d) of the Clean Air Act because it can only regulate power plants under section 112 of the CAA.

   - How would you respond to this criticism?

A: The legal argument in your question is being litigated as part of this judicial review, but

it is our reading of the statutory text that it bars EPA from regulating a source category for the same pollutant under both Section 111(d) and Section 112. Under this interpretation, the exclusion in 111(d) does NOT preclude EPA from regulating CO_2 from power plants, even though power plants are regulated for other pollutants under Section 112, because CO_2 is not a pollutant regulated under Section 112.

6) Critics have suggested that it will be nearly impossible for States to meet the new Ozone standard because of the transport of air pollution from countries like Mexico and China.

   - Do you think the presence of international emissions is a valid reason not to strive for reductions in air pollutants and improvements to our air quality?

   - Does EPA take international emissions into account when setting standards for air quality? If so, how does inclusion of international emissions impact a State's ability to attain air quality standards?

A: First, based on our review of air quality data and projections, EPA does not expect that uncontrollable background concentrations of ozone, from sources like natural (e.g., wildfires) or foreign emissions, will preclude attainment of the ozone standard with a level of 70 ppb. In addition, the Clean Air Act is clear that states are not responsible for reducing emissions over which they have no authority. This includes interstate transport, international emissions, and background emissions such as from wildfires or dust storms. Several provisions of the CAA address those situations and provide for special treatment for areas affected in these ways.

For example, Section 179B of Clean Air Act allows the EPA to approve an attainment demonstration for a nonattainment area if: (1) The attainment demonstration meets all other applicable requirements of the CAA; and (2) the submitting state can satisfactorily demonstrate that "but for emissions emanating from outside of the United States," the area would attain and maintain the ozone standard. The EPA has historically evaluated these "but for" demonstrations on a case-by-case basis, based on the individual circumstances, the classification of the area and the data provided by the submitting state. These data have included ambient air quality monitoring data, modeling scenarios, emissions inventory data and meteorological or satellite data. Due to the fact specific nature of section 179B demonstrations, the process and information required will be dependent on the circumstances of the state or locality in question.

Section 179B ensures that states will take actions to mitigate the public health impacts of exposure to ambient levels of pollution that violate the NAAQS by imposing reasonable

control measures on the sources that are within the jurisdiction of the state, to extent required under the Act, while also authorizing the EPA to approve such attainment plans and demonstrations even though they may not fully address the public health impacts of international transport.

Rep. Bonamici Questions for the Record

June 22nd Hearing with EPA Administrator Gina McCarthy

Question 1: Administrator McCarthy, I was encouraged to learn about the recently announced joint climate pledge between the United States, Mexico, and Canada that aims to produce 50 percent of the continent's electricity from clean energy sources by 2025.

Addressing climate change is important to my constituents in northwest Oregon and to the economy of our state. I would like to enter into the record a letter from prominent scientific organizations about the urgent need to take action on this issue. I frequently speak with people whose livelihood is affected by climate change, including people on the coast who rely on a healthy ocean, growers of our famous pinot grapes in Yamhill County, and entrepreneurs who are developing new clean energy technologies. Recently I visited a small business in Beaverton, Oregon. These dedicated business owners used to sell a lot of snowboards; now they are transitioning to skate boards because there's just not enough snow. These Oregonians join the millions of others across the country who are looking for leadership on this critical issue.

How has the willingness of the United States to act decisively on climate change affected the response from the rest of the international community?

A: One of the goals of the President's Climate Action Plan is to demonstrate global leadership on climate change, and as a result of this leadership the United States is not alone in taking action on climate change. Our action is the catalyst for countries around the world to see that the United States is serious and thus to take their own serious steps. I visited China earlier this year and heard about the progress they are making. The Chinese government knows that air pollution is a major domestic public health and economic challenge; knows that climate change is a global threat that requires global action; and knows that addressing the two can go hand-in-hand. The Chinese have set ambitious goals for new clean energy generation, and are putting into place market mechanisms to cap emissions from key sectors. Similarly, the Indian Prime Minister just visited the United States and a key outcome of his meetings with President Obama were more pledges of cooperative work on climate and clean energy. The robust transparency measures included in the Paris agreement will allow us to know how other countries are progressing in achieving the goals that they have set.

Question 2: Oregon has been proactive in its efforts to reduce greenhouse gas emissions. When I was in the state legislature, I helped establish some of the state's carbon emissions reduction goals. And new Oregon legislation will require 50 percent renewables by 2040, and a total phase-out of coal-fired electricity by 2035.

Some contend that environmental regulations might harm the economy. This hasn't been the case in Oregon, where we have a vibrant renewable energy industry. Vestas, a global wind energy

company with its North American Headquarters in my congressional district, just received an order of 1000 wind turbines for a proposed wind farm in Iowa, and a few months ago, an order for 300 turbines for a wind farm in Colorado.

Administrator McCarthy, will you please explain the potential for good jobs in clean energy, including the potential from developing and demonstrating the next generation of clean energy and environmental technologies?

A: Increased demand for clean and efficient energy provides the U.S. with opportunities to innovate, to create that next generation of American-made clean energy and environmental technologies that will be sold in the U.S. and around the world and to support American jobs developing, demonstrating and deploying those technologies. This increased demand, both domestically and internationally, for clean energy technologies increases economic opportunities for the U.S., particularly related to jobs that support clean energy and energy efficiency. These jobs include the workers who manufacture and install solar panels, wind turbines, insulation, high efficiency appliances and equipment, and electric vehicles. It includes the inventors and engineers that design and develop new, cleaner energy technologies. It also includes the workers who retrofit homes and businesses and those that enhance heating and cooling systems to be more energy efficient.

Use of clean and efficient energy is expected to increase in the U.S. According to the EIA in their Annual Energy Outlook (AEO) 2016, total renewable electricity generation is expected to increase from 2015 to 2030 across all regions of the U.S.[1] Total wind and solar generation, without factoring in any impacts of the Clean Power Plan, is expected to double by 2030.[2] Electricity generated from renewables is expected to grow by 9% in 2016 alone.[3] The U.S. added 8.1 gigawatts of wind power capacity in 2015 – and those installations represent a 12.9% increase from 2014 levels.[4]

Energy efficiency programs are also expected to increase in the next decade or more. Lawrence Berkeley National Laboratories (LBNL) projected that by 2025, spending on utility-run energy efficiency programs may double to $9.5 billion but could increase substantially beyond that depending upon how policies are implemented.[5]

According to the U.S. Energy and Employment Report (USEER), there are 600,000 workers employed in low carbon emission technologies, including 200,000 that spend the majority of their time on solar and another 77,000 that are employed at wind firms.[6] According to LBNL, state RPS-related investments in renewables in 2013 and 2014, supported nearly 200,000 U.S.-based gross jobs in 2013 and drove over $20 billion in gross

[1] AEO2016, EIA. P. IF-7. https://www.eia.gov/forecasts/aeo/pdf/0383(2016).pdf
[2] AEO2016, EIA. P. IF-10. https://www.eia.gov/forecasts/aeo/pdf/0383(2016).pdf
[3] http://www.eia.gov/todayinenergy/detail.php?id=24792
[4] http://www.eia.gov/todayinenergy/detail.php?id=25172, http://www.eia.gov/todayinenergy/detail.php?id=25912
[5] The Future of Utility Customer - Funded Energy Efficiency Programs in the United States: Projected Spending and Savings to 2025, LBNL, 2013. https://emp.lbl.gov/sites/all/files/lbnl-5803e_0.pdf
[6] USEER, US DOE, 2016 http://energy.gov/sites/prod/files/2016/03/f30/U.S.%20Energy%20and%20Employment%20Report.pdf

domestic product (GDP).[7] Additional demand would likely bring additional jobs.

USEER finds that 1.9 million Americans are currently employed, in whole or in part, in the design, installation or manufacture of energy efficient products and services, with 1.2 million of those jobs in the construction industry. An analysis by the Pacific Northwest National Laboratory found that a 15 percent increase in energy efficiency - in residential and commercial buildings alone - could add 320,000 new jobs by 2030. Increased demand for renewables, like wind and solar, and for energy efficiency products and services can bring increased demand for jobs.[8] Many of these are jobs that are performed locally and cannot be exported.

[7] A Retrospective Analysis of the Benefits and Impacts of U.S. Renewable Portfolio Standards, LBNL, 2016. https://emp.lbl.gov/sites/all/files/lbnl-1003961.pdf

[8] Assessing National Employment Impacts of Investment in Residential and Commercial Sector Energy Efficiency: Review and Example Analysis, 2104. PNNL-23402. http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-23402.pdf

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February 24, 2017

Hon. Scott Pruitt
Administrator-Nominee, Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Dear Administrator Pruitt:

Congratulations on your recent confirmation as Administrator of the Environmental Protection Agency (EPA). In this new role, we, the undersigned, write to raise your awareness and convey our concern regarding the inclusion of the heavy duty trailer industry in the joint EPA – National Highway Traffic Safety Administration (NHTSA) October 25, 2016 Final Rule entitled, *Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles – Phase 2* (GHGP2).

Our concerns contain two elements. First is the EPA's illegal extension of its legislative authority under the Clean Air Act by qualifying a trailer as a "new motor vehicle". Second, if the EPA can prove legislative authority does actually exist to uphold this classification, we hold grave concerns regarding the regrettable – and even tragic – consequences. For these reasons, we ask that you review the record and consider whether it would be appropriate to eliminate the heavy-duty trailer manufacturing industry from the rulemaking in order to correct the agency's legislative overreach.

Under the Clean Air Act (42 USC 7521(a)), Congress required the EPA to regulate "any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which ... may reasonably be anticipated to endanger public health or welfare." Under 42 USC 7550(b), motor vehicle "means any self-propelled vehicle designed for transporting persons or property on a street or highway." Indisputably, trailers are inert, cannot move under their own power, do not have an engine and do not generally produce emissions. Therefore, including truck trailers under the Clean Air Act's pollutant regulations is an abuse of the EPA's jurisdictional claim.

Through the SmartWay Program, a currently voluntary program to assist in the implementation of the GHGP2, the EPA sets forth trailer engineering standards to improve a truck operator's fuel economy in a heavy-duty tractor-trailer combination traveling at highway speed. Although data supports the gains from increased efficiency of these standards for tractor-trailers traveling at highway speed, data submitted to the EPA from a range of commenters reportedly demonstrates that the same benefits are not achieved when traveling at less-than-highway speeds. The American Trucking Association states that at least half of all tractor-trailer usage occurs not on highways but at lesser speeds around towns and cities. This means that at least half of tractor trailers will be required to make the engineering adjustments to comply with regulation but will not experience increased efficiency.

However, adding weight to trailers by altering their engineering to meet standards will displace cargo in order for the truck operator to remain in compliance with Gross Vehicle Weight laws on the roads. This will

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paradoxically require more tractor-trailers on the road just to maintain current freight transportation levels, which will clearly have the net effect of increasing greenhouse gas (GHG) rather than reducing it. Despite the trucking industry's admirable safety record, more tractor-trailers compiling more miles and facing more accident exposure will unnecessarily lead to more traffic fatalities. Toward this end, NHTSA states on pages 356 and 357 of the joint EPA-NHTSA rulemaking:

> *"According to FMCSA's 2014 annual report for 'Large Truck and Bus Crash Facts' indicates (sic) there are less than 1.67 fatalities per 100 million vehicle miles traveled (VMT) by combination trucks in the U.S. for 2014. When multiplied by an estimated 184 million additional truck miles due to weighed-out trucks, the result is an increase of about 3 fatalities, or 2.7 fatal crashes."*

Trucking operators capable of benefitting under SmartWay already enjoy economic and competitive incentives. It would seem that those who cannot achieve improved efficiencies because they too frequently travel at lesser speeds have no reason to add costly add-ons to trailers that, additionally, will increase crash fatalities.

It is our belief and aim to bring to your attention that the EPA does not possess the Clean Air Act authority in this instance. Trailers do not self-propel or generate emissions, and trailer manufacturers do not construct motor vehicles. If they are treated as such and are required to meet the same requirements, costs will increase and GHG will worsen, rather than improve. Of greatest concern is that more people will unnecessarily die each year as a result of this ill-considered rule. The House of Representatives took action to prevent these tragic outcomes by including an EPA prohibition on spending to implement, enforce, et al. the rulemaking against trailer manufacturers within the House FY 2017 Interior, Environment and Related Agencies appropriations bill. Regardless, as Administrator of the EPA, we hope you will review this matter as quickly as possible and address the concerns we have raised. For more information, please do not hesitate to contact Aubrey Neal in Representative Barry Loudermilk's office at Aubrey.Neal@mail.house.gov.

Sincerely,

Barry D. Loudermilk
Member of Congress

Morgan Griffith
Member of Congress

Kevin Cramer
Member of Congress

Brian Babin
Member of Congress

Jeff Fortenberry
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Blake Farenthold
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IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

TRUCK TRAILER MANUFACTURERS ASSOCIATION, INC. *et al.*, Petitioners, v. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *et al.*, Respondents.	No. 16-1430 (consolidated with No. 16-1447)

PETITIONER'S NON-BINDING STATEMENT OF ISSUES

Pursuant to this Court's orders of December 23, 2016 and January 23, 2017, Petitioner Truck Trailer Manufacturers Association, Inc. respectfully submits this non-binding statement of issues to be raised in this appeal of a final action taken by the United States Environmental Protection Agency ("EPA") and the National Highway Traffic Safety Administration ("NHTSA") (collectively, the "Agencies"), published in the Federal Register at 81 Fed. Reg. 73478 (Oct. 25, 2016), titled "Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles □ Phase 2" ("Final Rule").

The Agencies' Final Rule exceeds the Agencies' statutory authority, is contrary to the Clean Air Act ("CAA") and the Energy Independence and Security

Act ("EISA"), is arbitrary and capricious, and is otherwise contrary to law for the following reasons:

1. EPA does not have statutory authority to regulate trailers under the CAA because, among other reasons, trailers are not "motor vehicles" within the meaning of section 216(2) of the CAA, 42 U.S.C. § 7550(2) (defining "motor vehicle" to mean a "self-propelled vehicle designed for transporting persons or property on a street or highway").

2. NHTSA does not have statutory authority to regulate trailers under the EISA because, among other reasons, the EISA definition of "commercial medium- and heavy-duty on-highway vehicle" in 49 U.S.C. 32902(k) excludes trailers.

3. The Agencies utilized unrealistic assumptions and incomplete data in performing their cost/benefit analyses. Among other things, the Agencies utilized unrealistic assumptions regarding the average speeds at which trailers travel and the costs of the mandated aerodynamic devices, thereby overstating the greenhouse gas and fuel economy benefits of the mandated devices in relation to their costs. The Agencies also failed to account adequately for the additional greenhouse gas emissions generated by the manufacture, delivery and disposal of the mandated aerodynamic devices, and the Agencies have overestimated their useful life. The Agencies also failed to account adequately for the redirection of cargo to unregulated alternative modes of transportation, such as container chassis, which

are heavier and less aerodynamic in design, thus resulting in more greenhouse gas emissions and fuel consumption.

4. The Agencies failed to account fully for the additional weight that aerodynamic devices add to trailers, which (a) increases fuel consumption and brake wear, and (b) displaces cargo, resulting in more trips to deliver the same amount of cargo (and thus more greenhouse gas emissions and fuel consumption, and more injuries and deaths in truck-involved highway accidents).

5. The Final Rule's warranty requirements are arbitrary and capricious.

Dated: February 22, 2017

Respectfully submitted,

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Attorneys for Petitioner Truck Trailer Manufacturers Association, Inc.

CERTIFICATE OF SERVICE

I hereby certify that on February 22, 2017, I electronically filed the foregoing with the Clerk of the Court using the CM/ECF system, which will send notice of such filing to all registered CM/ECF users.

Dated: February 22, 2017

/s/ Elisabeth S. Theodore
Elisabeth S. Theodore

To: Charmley, William[charmley.william@epa.gov]; Sargeant, Kathryn[sargeant.kathryn@epa.gov]; Hoyer, Marion[hoyer.marion@epa.gov]; Cullen, Angela[cullen.angela@epa.gov]
From: Spears, Matthew
Sent: Tue 1/10/2017 5:54:47 PM
Subject: 1st DRAFT of SAE Govt Industry 2017 Matt Spears' Presentation
DRAFT SAE Govt Industry 2017 Matt Spears Presentation.pptx

To all:

Please find attached a first draft of my SAE Government Industry presentation. I have 10-15 minutes to speak.

Would you please let me know if you have any comments, questions or suggestions for revision? Thanks.

Regards,

Matthew Spears

Center Director, Heavy-Duty Diesel Standards U.S. Environmental Protection Agency

2000 Traverwood Dr.

Ann Arbor, MI 48105

spears.matthew@epa.gov

w. 734-214-4921

m. 734-276-7079

To: Charmley, William[charmley.william@epa.gov]; Orlin, David[Orlin.David@epa.gov]; Moulis, Charles[moulis.charles@epa.gov]; Yanca, Catherine[yanca.catherine@epa.gov]; Mitchell, George[Mitchell.George@epa.gov]; Cullen, Angela[cullen.angela@epa.gov]; Brakora, Jessica[Brakora.Jessica@epa.gov]; Ryan Hagen[ryan.hagen@dot.gov]; James Tamm[james.tamm@dot.gov]
From: Spears, Matthew
Sent: Sat 1/7/2017 4:06:35 PM
Subject: Another petition for reconsideration of HD Phase 2: RMA (tire manufacturers), next steps?
RMA Petition of Phase 2 Rule as Filed_12.23.16.pdf
ATT00001.htm

Hi all (& Happy New Year Jim & Ryan),

Please see RMA's note below.

Some of us EPA engineers on the Phase 2 team are agreeable to having another informal technical call with RMA, as they seem to suggest below. Ex. 5 - Deliberative Process, Attorney Client

Ex. 5 - Deliberative Process, Attorney Client

Here's more background:

In mid-December Chuck, Angela & I spoke informally with Jesse & Tracey about all of their items in their petition. They seemingly wanted to work with us to address some of their issues. We even seemed to agree on a couple potential minor clarifications that we could make (through guidance or a future tech amendment to Phase 2) to provide them some flexibility on test procedures, where the onus still would be on them to attest to equivalence. Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

Anyway, any advice on next steps for engaging with RMA would be much appreciated.

Regards,

Matthew Spears
Center Director, Heavy-Duty Diesel Standards
U.S. Environmental Protection Agency
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Begin forwarded message:

From: "Jesse Levine" <JLevine@rma.org>
To: "Spears, Matthew" <spears.matthew@epa.gov>, "Cullen, Angela" <cullen.angela@epa.gov>, "ryan.hagen@dot.gov" <ryan.hagen@dot.gov>
Cc: "Tracey Norberg" <TNorberg@rma.org>
Subject: RMA Petition for Reconsideration of Phase 2 Rule

Matt, Angela, and Ryan,

As you may know, on December 23rd, RMA filed a petition for reconsideration requesting that EPA and NHTSA reconsider several aspects of the Phase 2 rule. It would be great if we could schedule a call next week to discuss potential solutions to the issues raised in RMA's petition.

Next Tuesday late afternoon (1/10), Wednesday late afternoon (1/11), or Friday afternoon (1/13) works well for us. We look forward to speaking with you.

Best,

Jesse

Jesse Levine

Manager, Regulatory Affairs

Rubber Manufacturers Association

1400 K Street, NW, Suite 900

Washington, DC 20005

jlevine@rma.org

(o) (202) 682-4866

To: Grundler, Christopher[grundler.christopher@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Charmley, William[charmley.william@epa.gov]; Moran, Robin[moran.robin@epa.gov]; Wysor, Tad[wysor.tad@epa.gov]; Olechiw, Michael[olechiw.michael@epa.gov]; Orlin, David[Orlin.David@epa.gov]; Silverman, Steven[silverman.steven@epa.gov]
From: Sutton, Tia
Sent: Fri 1/6/2017 9:31:35 PM
Subject: FW: QFRs for the mid-term eval hearing have been submitted
EPA_NHTSA QFRs2017-01-06-155617.pdf
QFRs EPA+NHTSA Responses Final 010517.pdf

And we're done! Thank you everyone for helping to get these QFRs over the hump and out the door!

From: Haman, Patricia
Sent: Friday, January 06, 2017 4:06 PM
To: Sutton, Tia <sutton.tia@epa.gov>
Cc: Niebling, William <Niebling.William@epa.gov>
Subject: QFRs for the mid-term eval hearing have been submitted

For your records – I will work with our staff to close out in CMS next week. Pat

Patricia Haman

Office of Congressional Affairs

U.S. EPA

202-564-2806

To: Charmley, William[charmley.william@epa.gov]; Cullen, Angela[cullen.angela@epa.gov]
Cc: Sargeant, Kathryn[sargeant.kathryn@epa.gov]
From: Spears, Matthew
Sent: Wed 1/4/2017 2:26:02 PM
Subject: our discussion at 1pm today

Hi all,

I accepted this meeting invite, and I will call in via Bill's teleconference number.

Ex. 5 - Deliberative Process

Regards,

Matthew Spears

Center Director, Heavy-Duty Diesel Standards U.S. Environmental Protection Agency

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m. 734-276-7079

From: Charmley, William
Sent: Wednesday, January 04, 2017 9:03 AM
To: Spears, Matthew <spears.matthew@epa.gov>; Cullen, Angela <cullen.angela@epa.gov>
Cc: Sargeant, Kathryn <sargeant.kathryn@epa.gov>
Subject: FW: New Honor Award Form

Matt and Angela –

Please see below.

I would like to have a meeting today to discuss a final decision on the list of people for the group of 20 + 2. I will also ask Cay and Chuck to participate. We will include a call-in number for Matt.

Thanks

Bill

From: Bradish, Tracey
Sent: Wednesday, January 04, 2017 8:58 AM
To: Charmley, William <charmley.william@epa.gov>
Cc: Storhok, Ines <storhok.ines@epa.gov>; Sargeant, Kathryn <sargeant.kathryn@epa.gov>
Subject: RE: New Honor Award Form

Bill,

Ex. 5 - Deliberative Process

Tracey

From: Charmley, William
Sent: Tuesday, January 03, 2017 1:18 PM
To: Bradish, Tracey <bradish.tracey@epa.gov>
Cc: Storhok, Ines <storhok.ines@epa.gov>; Sargeant, Kathryn <sargeant.kathryn@epa.gov>
Subject: RE: New Honor Award Form

Tracey,

My managers and I are still trying to figure out what to do with the potential to nominate 2 "Mission Support Staff", which could enable us to go up to 22 people.

On page 7 of this form, there is the following language

MISSION SUPPORT STAFF STATEMENT

In the case of the Gold/Silver Medal nominations, if there are no mission support staff included
a statement explaining their absence. Support staff must be permanent Federal Government emp
Employment (SEE) program enrollees, students hired under the Pathways program, and contrac
National Honor Awards. "Mission support staff" is defined as employees who perform critical
Agency achieving its mission, but generally do not involve the actual completion of the produc

And on Page 7 it also includes the following:

SUPPORT STAFF STATEMENT

In the case of the Gold/Silver Medal nominations, if there are no support staff included, the justi
statement explaining their absence. Support staff must be permanent Federal Government emplo
Employment (SEE) program enrollees, students hired under the Pathways program, and contract
National Honor Awards. "Support staff" is defined as secretarial, clerical and technical employe
permanent federal government employees.

So it is clear that "Support Staff" are include tasks such as "secretarial, clerical, and technical employees only "

It is the Mission Support Staff we are trying to figure out. Here the award says Mission Support Staff "is defined as employees who perform critical functions essential to the Agency achieving its mission, but generally do not involve the actual completion of the products or actions themselves"

- We have a few staff that we were thinking of for Mission Support Staff, and I want to list them and give you an idea of what work they did:

Ex. 5 - Deliberative Process

Do any of these people's work seem as though they would fall under the category of "Mission Support Staff"?

Please let me know if you would like to discuss in person.

Thanks

Bill

From: Bradish, Tracey
Sent: Tuesday, January 03, 2017 10:48 AM
To: Simon, Karl <Simon.Karl@epa.gov>; Moltzen, Michael <Moltzen.Michael@epa.gov>; Henning, Julie <henning.julie@epa.gov>; Charmley, William <charmley.william@epa.gov>; Storhok, Ines <storhok.ines@epa.gov>; Sargeant, Kathryn <sargeant.kathryn@epa.gov>; Haugen, David <haugen.david@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Watkins, Erica <Watkins.Erica@epa.gov>; Bunker, Byron <bunker.byron@epa.gov>; Cohen, Janet <cohen.janet@epa.gov>; Manners, Mary <manners.mary@epa.gov>; Cook, Leila <cook.leila@epa.gov>
Subject: New Honor Award Form

All,

Attached you will find a new version of the national honor award form. Every honor award has to be on this new form. No action necessary right this minute, but a couple of key dates you should note:

Jan 9: OAR Awards board determines which honor awards OAR will move forward

Jan 9: ASD, your complete gold nomination (also on new form) has to be sent to me, Luddie, Julie, and Scott in both pdf and word

Jan 11: Each award making the cut has to be sent **on this new form** to me in PDF and word. **Those with approved awards will have to redo cover sheets.**

Jan 12: Awards sent to OAR for signature (by me)

Thanks everyone.

Tracey

Additional Questions for the Record
Janet McCabe and Paul Hemmersbaugh Testimony, September 22, 2016

Combined EPA and NHTSA Responses

The Honorable Michael C. Burgess M.D.

1. In your written statement and oral testimony, you mentioned how the "footprint" standards preserve consumer choice and individualize the standards. However, automakers will be required to make significant improvements to the fuel economy of all vehicles, irrespective of footprint. This will impact the types of engines available within a particular vehicle class, the materials used to construct the vehicle (e.g. aluminum and other lighter-weight material) and the fuel-saving technology that will come with the vehicle (e.g. start-stop technology).

   A. Please explain how NHTSA and EPA assessed the extent to which consumer choice will be impacted with respect to the performance capabilities and vehicle features within a given vehicle footprint.

   A. Is there anything besides the "footprint standards" that preserve consumer choice?

   B. For example, what (if anything) did EPA and NHTSA do to ensure that consumers will still be able to purchase high-performance vehicles with large towing capacity, should they or their small business need to do so?

   C. Similarly, were the agencies concerned that consumers may be forced to purchase vehicles with certain fuel saving technologies that don't fit their needs, and if so, how did they address that concern? Have you studied whether entry point vehicles will be disproportionately impacted?

EPA Response

In designing the 2012-2025 GHG standards, in coordination with NHTSA, EPA carefully considered the impact the standards can have on vehicle utility and consumer choice so that when automotive companies comply with the standards, they have the ability to maintain vehicle utility and consumer choice. EPA and NHTSA decided to use vehicle "footprint" as the attribute to determine the GHG standards for a given automotive manufacturer's fleet (the standard being the production-weighted average of the footprint-based targets for each vehicle produced). The standards vary by footprint such that larger vehicles have higher GHG and lower fuel economy targets than smaller vehicles. The program is "self-adjusting" in that if a manufacturer sells a larger mix of vehicles, then its overall fleet wide standard will be less stringent than if it sells a smaller mix of vehicles.

In addition to footprint-based standards, EPA considered many other provisions of the rule, and

the data and analysis by which the standards were developed, to work together to preserve consumer choice and vehicle affordability. These provisions include:

- The establishment of separate passenger car footprint-based standards and light-truck footprint-based standards;
- The establishment of performance-based standards (*i.e.*, not mandating use of any particular technology) that allow the auto companies to decide what technologies work best for their customers to achieve the standards;
- The establishment of a GHG emissions averaging, banking, and trading program;
- Using analytical methods and data to ensure the standards themselves are predicated on no loss in vehicle performance;
- Flexible credit generation provisions including generation of CO_2 credits from improvements in air conditioning systems and off-cycle credits, and the trading of credits for over-compliance with nitrous oxide, methane, and CO_2 credits;
- The specific shape of the passenger car and light-truck curves, which were carefully designed to represent approximately equal levels of technical challenge for each individual footprint value along the footprint standard curves;
- A change to the shape of the light-truck footprint standard curve beginning in model year 2017 to more accurately recognize the unique characteristics of high performance pickup trucks, including the need for those vehicles to perform significant towing and maintain payload capabilities;
- Providing very long lead-times for the development and deployment of technologies, up to 13 years for the most stringent 2025 standards, which with the use of the emissions averaging, banking and trading program can be extended to 18 years if needed.

These program elements and considerations in the establishment of the stringency of the 2012-2025 GHG standards provide the automotive companies with a wide range of tools to ensure that they can continue to design and sell the types of products with the utility and capability that their customers want.

With regard to consumer choice within a given vehicle footprint, a manufacturer is not required to meet the exact footprint-based CO_2/fuel economy target of any particular vehicle; rather, the manufacturer has flexibility to meet the standards on a fleet-wide average basis. Thus, within a given footprint, a manufacturer may choose to produce vehicles that have GHG emissions that are higher or lower than the given footprint-based target, and the program provides a wide range of flexibilities to achieve compliance, such as averaging and opportunities for credit transfers and credit trading. Similarly, with regard to high-performance or large towing capacity, a manufacturer is not obligated to meet the exact footprint-based CO_2/fuel economy target for those particular vehicles, but has the flexibility to meet the standards on a fleet-wide average basis. Based on EPA's reports of manufacturer's performance in meeting the standards so far, for the first four years of the program (model years 2012-2015), the industry overall has outperformed the standards each year, and this has occurred during a time when vehicles sales have also increased in each of these years. This is an indication that it is possible for consumers to purchase the vehicles that meet their needs while achieving significant GHG reductions/fuel economy improvements, and that automakers

have found ways to satisfy their customers' needs in ways that still enable them to not only meet, but beat, the standards.

With respect to the last question regarding entry-point (lower-priced) vehicles and disproportionate impacts, EPA carefully considered the issue of vehicle affordability and impacts on lower-income consumers, both in the 2012 final rule establishing the 2017-2025 standards, and in the Draft Technical Assessment Report (TAR) published this past July. In the Draft TAR, the agencies discussed this issue (see Chapter 6.5.4), and found that in model year 2015 nearly the same number of low-priced vehicle models (that is, those with a manufacturer's suggested retail price of less than $15,000) were sold as in 2001-2009 annually. Thus, to date, it appears that manufacturers have been able to preserve the number of offerings in this segment, likely due at least in part to all of the program design elements and flexibilities available to automotive manufacturers as described above. The agencies further found that, while prices of these entry-point vehicles have risen somewhat from 2001-2015, the content of some vehicles in this segment has also increased (e.g., Bluetooth, audio controls), which likely has contributed to any price increases.

NHTSA Response

RESPONSE to 1.A:

NHTSA's Corporate Average Fuel Economy (CAFE) standards allow manufacturers to choose where and how they make improvements. Nothing in the program prevents manufacturers from producing some vehicles with fuel economy that falls well below their footprint target, as long as the difference is made up by another vehicle or vehicles above their targets.

When NHTSA sets standards, it accounts for consumer choice within particular segments by considering technology in vehicle classes only where it is appropriate to do so. For example, high compression ratio engines, plug-in hybrids, and some "strong" hybrid technologies may not be practical for full-size pickups due to the ways they are used by consumers. In addition, among other things, NHTSA's model incorporates phase-in caps tailored to assumptions about consumer purchasing behavior, and it endeavors to keep performance constant as technology is applied. NHTSA's modeling also carefully considers the anticipated pace of vehicle redesigns, which is typically more widely-spaced for full-size pickups and some performance cars than for many passenger cars. NHTSA seeks to ensure that the CAFE modeling is as realistic as possible. By modeling a compliance path for industry that incorporates factors like those mentioned above, the setting of maximum feasible standards is unlikely to require manufacturers to change the vehicles they sell in ways that consumers will reject. Manufacturers have substantial flexibility to decide where and how to make their improvements.

RESPONSE to 1.B:

Unlike vehicle safety standards or EPA exhaust emissions standards, CAFE standards apply to average fuel economy levels, not per-vehicle fuel economy levels. In addition, the Energy

Independence and Security Act of 2007 (EISA) expanded flexibilities already available under the Energy Policy and Conservation Act of 1975 (EPCA), allowing CAFE credits to be transferred between fleets and traded between manufacturers. The long-standing averaging-based approach provided by EPCA and the expanded flexibilities introduced by EISA together allow manufacturers to balance compliance obligations and provide a wide range of vehicles while ensuring that their fleet, on average, complies with the program, thereby preserving consumer choice. NHTSA sets standards accounting for a wide range of vehicles offered by manufacturers with an understanding that not all technologies will be uniformly adopted by consumers.

RESPONSE to 1.C:

NHTSA's CAFE standards are based on vehicle footprint, resulting in larger vehicles having lower fuel economy targets than smaller vehicles. Lower footprint targets for larger, high-performance vehicles acknowledge that fuel economy improvements can be made without requiring technology that would reduce the utility of those vehicles. Further, the agencies selected the truck curve (e.g., steeper curve slopes and longer cut points) so that manufacturers should be better able to avoid downgrading the performance or utility of the largest vehicles while still having an incentive to improve their fuel economy. Additionally, NHTSA's analysis and methodology mentioned above helps to account for consumer preferences for vehicle attributes other than fuel economy. Regarding vehicles with large towing (and/or payload) capacity, such as may be needed by some small businesses, heavy-duty pickups and vans are regulated separately under standards defined in terms of a "work factor," which explicitly accounts for vehicle characteristics such as vehicle payload, towing capacity, and four-wheel drive.

RESPONSE to 1.D:

NHTSA's analysis recognizes that not all fuel economy technologies can or will be incorporated uniformly across manufacturer fleets. Manufacturers can choose where and how to improve the average fuel economy of their fleets based on the needs of consumers. Manufacturers may choose to concentrate their efforts in certain segments or to spread improvements across greater portions of their fleets. NHTSA does not dictate any specific compliance path. As a result, consumers will be able to buy any vehicle they choose that fits their needs. Affordability of entry point vehicles is a topic that NHTSA will look at more closely in the upcoming notice of proposed rulemaking (NPRM) as part of our assessment of economic practicability, which is one of the factors that the Agency must consider in setting maximum feasible CAFE standards.

2. **[Question to EPA only]** In light of the fact that a manufacturer's fleet-average GHG emissions are limited by these standards, does the California ZEV mandate achieve any additional benefit in terms of GHG reductions from the light duty fleet?

EPA Response

While the fleet-average GHG emissions standards establish minimum standards, they do not limit the ability of manufacturers to achieve further reductions, and any manufacturer that does

will generate credits that can be used or traded. The EPA GHG standards are performance standards, and do not require any specific technology. That is not the case with the California ZEV mandate, which thus provides an incentive for automotive companies to invest in more advanced technologies. EPA's assessment for the Draft TAR indicates that were it not for the California ZEV program, most auto companies would not produce as many all electric and plug-in hybrid electric vehicles in the 2025 time frame. California adopted its ZEV program to address multiple pollutants, including GHGs, and the reductions in pollution from ZEVs in California help address the significant air quality challenges in that state. ZEVs sold in California and other states will help a manufacturer to meet (or exceed) the EPA GHG standards.

3. In your opinion, are advances in conventional internal combustion engine technology (i.e., non-hybrid) sufficient by themselves to achieve the current standards for model year 2025? If not, could you please provide your estimates for how much of each of the following technologies (as defined in the TAR) will be required to achieve the current standards for model year 2025: (a) mild hybrid; (b) full hybrid; (c) plug-in hybrid electric vehicle; and (d) electric vehicle.

Joint Response

The agencies show in the Draft TAR that the 2022-2025 standards can be achieved largely through the use of advanced gasoline vehicle technologies with modest penetrations of strong hybrids and very low penetrations of full electrification (like plug-in hybrid electric vehicles, and all electric vehicles). The agencies' analyses in the Draft TAR present, respectively, different feasible, cost-effective compliance paths for manufacturers. Since the standards are performance-based, each manufacturer is free to choose the suite of technologies that it believes are best for its vehicles to meet the standards. In other words, these pathways are not an assumption of the minimum amounts of these technologies manufacturers will need to deploy to meet the standards.

Additional EPA Response

In EPA's estimates of a low-cost pathway by which a manufacturer could achieve the MY2025 standards, we projected fleet penetrations of about 18% mild hybrids, less than 3 percent full hybrids, less than 2 percent plug-in hybrid electric vehicles, and less than 3 percent electric vehicles.

Additional NHTSA Response

As Table ES-3 of the Draft Technical Assessment Report (TAR) shows, based on the assumptions used at that time, NHTSA's primary analysis for the TAR found that fleetwide compliance with the augural MY 2025 CAFE levels could generally be achieved with 14% mild hybrids; 14% full hybrids; less than 1% plug-in hybrid electric vehicles; and less than 2% electric vehicles. However, manufacturers may rely on different compliance strategies than those assumed by NHTSA in the TAR

4. According to Table ES-3 of the TAR, EPA's compliance pathway for meeting the MY2025 GHG standards envisions that 44% of vehicles would use higher compression ratio, naturally aspirated gasoline engines. If a manufacturer does not have that type of engine in any of its vehicles today, what steps would it have to take in order to integrate that type of engine in its product line, and how long would it take for it to reach a 44% penetration rate?

EPA Response

The use of higher compression ratio, naturally aspirated gasoline engines (Atkinson cycle engines) is just one technology among the many suites of potential technology pathways to compliance. EPA analyzed nine additional potential technology pathways by which the industry could comply with the 2022-2025 standards, including a pathway with only a 10% penetration of higher compression ratio, naturally aspirated gasoline engines (see Chapter 12.1.2 of the Draft TAR).

The steps required to implement an Atkinson cycle engine are relatively modest compared to implementing some of the other engine technologies being developed and implemented. The technology requires an intake valve cam phaser with a high range of control authority and increased geometric compression ratio (see the Draft TAR, Chapter 5.2.2.9, which describes the technology and provides examples of current implementations). The requisite cam phaser hardware is readily available to any manufacturer, and the technology is not restricted by patent protections. As discussed in the Draft TAR, it is EPA's assessment that this technology can be incorporated by any manufacturer and that there is sufficient time between now and the model year 2022 to 2025 that this technology can represent a high penetration rate of a company's products. We note that EPA's vehicle emissions rules have always incorporated the lead time necessary for the industry to comply. In this case, the standards were set in 2012 with an especially long lead time – more than 10 years – and the vehicle manufacturers have been developing a range of technologies for several years, as discussed in detail in the Draft TAR.

Several manufacturers – including Mazda, Hyundai, and Toyota -- are implementing forms of Atkinson cycle engine technology today, and other automakers have told EPA confidentially that they are planning to follow this path for some of their engines.

It is important to note that EPA's projected technology penetrations are meant to illustrate one of many possible technology pathways to achieve compliance with the MY2025 GHG standards. The rules do not mandate the use of any particular form of technology. Put another way, the standards are performance-based and thus manufacturers are free to select among the suite of technologies they best believe is right for their vehicles to achieve compliance. As we've seen in recent years with the rapid advances in a wide range of GHG-reduction technologies, ongoing innovation can be expected to result in further improvements to existing technologies and the emergence of others.

NHTSA Response

This question is specifically about EPA's analysis, and NHTSA defers to EPA to answer for its analysis. For NHTSA's analysis, NHTSA assumes that manufacturers that have already taken steps in other directions (in particular, toward downsized turbocharged engines) would continue in those directions rather than pursuing high compression ratio engines.

5. In the TAR, the EPA states that in its modeling, "the California Zero Emission Vehicles (ZEV) program is considered in the reference case fleet; therefore, 3.5% of the fleet is projected to be full EV or PHEV in the 2022-2025 timeframe due to the ZEV program and the adoption of that program by nine additional states." Since a significant portion of the required GHG reductions will be met through manufacturing electric-drive vehicles for the ZEV mandate, shouldn't EPA have considered those costs in its assessment of the costs of the regulation? If EPA had considered the costs of producing electric-drive vehicles, what impact would that have had on the cost estimates in the TAR?

EPA Response

The California ZEV program is an existingstate requirement that has been adopted by California, as well as several other states across the country – it is not a federal program. T herefore, consistent with guidance issued by the Office of Management and Budget,EPA included vehicles that are needed to comply with the ZEV program as part of our reference fleet in assessing the MY2022-2025 GHG standards (See OMB Circular A-4, Section E.2, "Developing a Baseline"). The Draft TAR does not include an assessment of the benefits or the costs of the ZEV program in the assessment of 2022-2025 National Program standards. However, any ZEV vehicles sold in California and other states will help a manufacturer in meeting the EPA GHG standards.

6. As was noted in the hearing, one of the goals of the so-called "One National Program" is to enable automakers to build a single fleet of vehicles that could be sold anywhere in the country. Can EPA/NHTSA please explain whether the modeling that each individually performed for the Draft TAR results in a single fleet for each manufacturer that simultaneously complies with the EPA greenhouse gas regulation, the NHTSA fuel economy regulation, and the State of California's zero emission vehicle regulation?

EPA Response

EPA's detailed modeling presented in the Draft TAR shows that each manufacturer has a compliance pathway for its projected MY 2025 GHG standards (see, for example, Table 12-4 and Tables 12-29 through 12-40 of the Draft TAR). In addition, EPA's assessment incorporates projected compliance with the ZEV program through our reference case (i.e. the fleet as it would exist in MYs 2022-2025 without complying with the GHG emission standards for those model years), as described in our response to Questions 2 and 5, and any ZEV-

compliant vehicles do count towards the manufacturers' GHG compliance. EPA did not explicitly model the CAFE program.

NHTSA Response

EPCA, as amended by EISA in 2007, establishes specific and clear direction regarding many CAFE provisions (e.g., attribute-based standards expressed as mathematical functions, separate standards for cars and trucks, separate compliance for domestic and imported passenger car fleets, caps on credit transfers and trades), and requires NHTSA to set each CAFE standard separately at the maximum feasible level in each model year. The Clean Air Act provides no corresponding direction.

Given these different statutory frameworks, NHTSA and EPA have attempted to harmonize requirements from model year 2012 forward. While manufacturers may choose to take advantage of EPA-specific provisions (e.g., credit for reducing emissions of high global warning potential refrigerants), the agencies have designed the standards so that it is possible for a fleet that complies with CAFE standards to comply also with greenhouse gas (GHG) standards. If manufacturers are also complying with the zero emission vehicle (ZEV) standard, the vehicles that they build in order to meet that standard would be counted toward CAFE compliance as part of their overall U.S. fleet. That said, NHTSA models compliance in accordance with its own statutory authority, and not with EPA's GHG standards or with CARB's ZEV program.

7. **[Question to EPA only]** You describe your next step in the midterm evaluation process as a proposed determination. First, when do you expect this step to occur? Second, when do you anticipate responding to public comment on the Draft TAR? Lastly, can you assure this Committee that the EPA isn't attempting to issue a proposed determination this year or before the next Administration is sworn into office?

EPA Response

On November 30, 2016, Administrator McCarthy signed the Proposed Determination referred to in this question, and has opened a 30-day public comment period. The Proposed Determination is based on years of extensive analysis that demonstrates that automakers are well on track to meeting the model year 2022-2025 standards through a wide range of technology pathways that are attractive to consumers.

As part of the Proposed Determination, EPA has fully considered and responded to the public comments we received on the Draft TAR this year as well as updated information.

EPA's detailed technical analyses are laid out in a comprehensive Technical Support Document. These analyses have led to a very strong proposed technical conclusion that the standards established in 2012 for the 2022-2025 model years continue to be appropriate, without change. EPA will consider any additional data and information we receive during this

additional public comment period, as part of the Administrator's Final Determination.

The Administrator views the factual record as clear and extensive, benefitting from significant public input from the automotive industry and many other stakeholders. At this point, the Administrator has a strong record that allows her to move forward with her proposed determination without delay. Given the benefits of regulatory certainty and the long lead time needed in the automobile manufacturing business, the Administrator will expeditiously consider all comments and will reach a Final Determination as the facts warrant.

Finally, it is important to recognize that the Proposed Determination is not a standard-setting rule; in fact, it is not a rule at all, and proposes absolutely no changes to the existing standards. Rather, it is a comprehensive reassessment of the state of technology and technology costs in the auto manufacturing sector and of trends that can be clearly identified today, and how this state of affairs relates to the effectiveness and appropriateness of the current standards

5. [Question to NHTSA only] As was noted in the hearing, one of the goals of the so-called "One National Program" is to enable automakers to build a single fleet of vehicles that could be sold anywhere in the country. Can NHTSA please explain whether the modeling that it individually performed for the Draft TAR results in a single fleet for each manufacturer that simultaneously complies with the EPA greenhouse gas regulation, the NHTSA fuel economy regulation, and the State of California's zero emission vehicle regulation?

NHTSA Response

EPCA, as amended by EISA in 2007, establishes specific and clear direction regarding many CAFE provisions (e.g., attribute-based standards expressed as mathematical functions, separate standards for cars and trucks, separate compliance for domestic and imported passenger car fleets, caps on credit transfers and trades), and requires NHTSA to set each CAFE standard separately at the maximum feasible level in each model year. The Clean Air Act provides no corresponding direction.

Given these different statutory frameworks, NHTSA and EPA have attempted to harmonize requirements from model year 2012 forward. While manufacturers may choose to take advantage of EPA-specific provisions (e.g., credit for reducing emissions of high global warning potential refrigerants), the Agencies have designed the standards so that it is possible for a fleet that complies with CAFE standards to comply also with greenhouse gas (GHG) standards. If manufacturers are also complying with the zero emission vehicle (ZEV) standard, the vehicles that they build in order to meet that standard would be counted toward CAFE compliance as part of their overall U.S. fleet. That said, NHTSA models compliance in accordance with its own statutory authority, and not with EPA's GHG standards or with CARB's ZEV program.

8. **[Question to EPA only]** Your agency modeled that the total plug-in electric vehicle market-share for 2025 would need to be over 4% in the United States to meet the State of California zero emission vehicle program requirements, approximately 6.5 times higher than its state in 2015 (0.66%, hybridcars.com). What enabling complimentary policies

from the federal government do you see as necessary to bring this modeled increase to fruition?

EPA Response

The Draft TAR analysis projects about 4% electric vehicles (EV) and plug-in hybrid electric vehicles (PHEV) in the 2025 fleet. Of this 4%, only about 1% was the increment driven by the GHG standards. The remaining vehicles were included in our reference fleet – either EV/PHEVs already in the MY2014 baseline fleet projected out to 2025 (~190,000 vehicles), or required by the California ZEV program (~420,000 vehicles). See Tables 4.27 and 4.28 of the Draft TAR. EPA is aware that California and the other states that have adopted the ZEV program have put in place many complementary policies to support the growth of EV and PHEVs in their states to support their adoption of the ZEV program.

EPA in general is supportive of and engaged in well-designed complementary federal government policies that will support the growth of the electrified vehicle market, as these technologies will likely be needed in order to meet the longer-term need to address GHG emissions from the transportation sector. EPA does not regard such programs as critical for the very small number of these vehicles (about 1%) projected in the Draft TAR analysis for compliance with the 2025 GHG standards.

10. [Question to NHTSA only] In your opening statement you described the levels of strong hybrids that NHTSA models as being necessary for compliance in 2025 as "modest". Can you please explain your reasoning given that the level of strong hybrids modeled was 14% (Draft TAR at ES- I 0), approximately five times the present level of the market (approximately 3%)?

NHTSA Response

The standards examined are for model year (MY) 2025. NHTSA believes that 14% is a modest level of strong hybrids for a model year that is almost a decade in the future. It bears repeating that it is up to manufacturers to determine how they choose to comply.

9. Both EPA and NHTSA modeled an average vehicle cost increase of $680 to $1,620 for manufacturers to bring vehicles into compliance with the 2025 regulations relative to the 2021 regulations. What is your total estimated cost increase for model year 2025 vehicles relative to 2016 model year vehicles for all regulations under your purview, including the 2017-2021 greenhouse gas and fuel economy regulations, "Tier 3" tailpipe emission regulation, and all applicable and reasonably anticipated safety regulations? Given these anticipated increases in vehicle price, what do you estimate the loss in vehicle sales related to these regulations to be? What are the resulting automotive and related industry job losses anticipated?

EPA Response

In the Draft TAR, EPA estimated an average per-vehicle cost of $1,565 for the industry to go from the MY2014 baseline fleet level to the MY2025 standards (see Table 12.44 of the Draft TAR). Since the Tier 3 tailpipe criteria pollutant emissions standards are already in effect, these regulations, as well as existing safety regulations, were treated as part of our reference fleet analysis. The Tier 3 light-duty vehicle emissions and fuel standards final rule in 2014 estimated that the cost of that program would be $72 per vehicle by 2025, when the program is fully phased in.

As explained in the Draft TAR, to date consumer response to vehicles subject to the GHG standards is positive. Our analysis in the Draft TAR also continues to project that the fuel savings over time will far exceed the up-front vehicle costs, which we believe should mitigate any potential impacts on vehicle sales. While there may be some net effect of the standards on jobs (for example, jobs spurred by increased auto industry and supplier expenditures on technologies to meet the standards or jobs lost because higher priced vehicles may lead to reduced sales) we believe any such effects are likely to be small compared to the large effects of the macroeconomic forces shaping the auto industry today.

NHTSA Response

Tier 3 is an EPA regulation, and not under NHTSA's jurisdiction, so NHTSA does not account for the costs of Tier 3 compliance in NHTSA rulemakings. Safety standards and fuel economy regulations can increase the cost of producing vehicles by requiring manufacturers and suppliers to internalize the otherwise-external costs to society of vehicle crashes, fuel use, and environmental impacts that safety standards and fuel economy regulations could prevent or mitigate. However, many long-term economic benefits still exist for consumers that are not accounted for in vehicle price, such as reduced fuel costs over the lifetime of a vehicle resulting from fuel economy improvements. Further, NHTSA does not believe that sales and job losses are inevitable as a result of increases in vehicle production costs. Also, given that manufacturers use safety and fuel economy as selling points, manufacturers would reasonably be expected to construct sales campaigns that explain to consumers how the benefits of these improvements outweigh any cost increases that manufacturers choose to pass on to consumers.

10. Both EPA and NHTSA developed two different analyses of the technologies required to meet the 2025 greenhouse gas and fuel economy regulations. You purport that these separate analyses show how manufacturers have many paths which could be chosen for compliance. Please explain how two completely different technology pathways both result in the "lowest" cost of compliance for a manufacturer and the American consumer?

Joint Response

The GHG and CAFE standards are performance standards, and manufacturers are free to choose exactly how they wish to comply. The agencies know that manufacturers will not choose

exactly the paths that our respective analyses reflect. The GHG and CAFE analyses shown in the Executive Summary for the Draft TAR are just two of many potential pathways for meeting the future standards. For example, in Section 12.1.2 EPA shows 9 other technology pathways by which the industry could comply with the MY2022-2025 standards. The separate analyses make our results more robust and credible.

The agencies' independent analyses complement one another and reach similar conclusions, including that advanced gasoline vehicle technologies will continue to be the predominant compliance choice, with modest levels of strong hybridization and very low levels of full electrification (plug-in vehicles) needed to meet the standards. It is important to note that the agencies' projected technology penetrations are meant to illustrate several of the many possible cost-effective technology pathways to achieve compliance with the MY2022-2025 GHG standards. The standards are performance-based and thus manufacturers are free to select among the suite of technologies they believe is best for their vehicles to achieve compliance.

Both the NHTSA and EPA models are based on cost optimization, and some of the differences in analysis are attributed to differences in each agency's modeling inputs or methods, many of which are due to differences in the agencies' respective statutes. As one example, only NHTSA's analysis considers EPCA/EISA's provisions regarding civil penalties and limitations on credit transfers. Again, the Agencies recognize that manufacturers may not choose exactly the path that we have modeled. Since CAFE and GHG standards are performance standards and not technology mandates, manufacturers are free to choose which technologies to apply to which vehicles in order to meet consumer demand and the standards at the same time, i.e., they have many potential pathways.

11. Auto manufacturers claim to have identified a number of technical issues with the technology benefit modeling described by the Draft TAR. What is your plan to address these concerns? Have your agencies verified these models against actual vehicles other than those the models were calibrated to directly? If so, what were the results?

EPA Response

EPA appreciates the public comments regarding our modeling in the Draft TAR; we have carefully considered the public comments on our technology analysis, and have updated our assessment in several areas in response to comments, as described in detail in the Proposed Determination. With respect to the modeling performed for the Draft TAR, EPA verified our models with actual vehicles and we use actual engine and transmission maps along with actual measured vehicle data in our modeling. This is described on our vehicle simulation model website (https://www3.epa.gov/otaq/climate/alpha.htm) and detailed in 16 recent peer-reviewed technical papers published by the Society of Automotive Engineers (SAE) describing our vehicle, engine, & transmission benchmarking, and the development and use of EPA's full vehicle simulation model. As summarized in SAE paper 2016-01-0910, EPA has tested over 25 different types of conventional and hybrid vehicles/engines across a wide range of powertrains and segments. The vehicles/engines were chosen based on our need to evaluate key technologies like naturally aspirated and boosted (turbocharged) I4/I6/V6 engines, using 5, 6 and

8+ speed automatic and dual-clutch transmissions, as well as continuously variable transmissions.

NHTSA Response

NHTSA is currently reviewing and will address comments regarding inputs (e.g., "engine maps" and transmission characteristics) to the full vehicle simulation work used to estimate the extent to which various combinations of fuel-saving technologies could reduce fuel consumption for different types of vehicles.

12. Fuel prices have changed significantly since 2012 when the 2022-2025 rules were first established. Can you explain why these changes in fuel prices have had minimal impact on your modeling results?

Joint Response

These changes in fuel prices are fully reflected in the Draft TAR analysis, and influence the initial conclusions stated in the Draft TAR. In the Draft TAR, the agencies used available data from the Energy Information Administration's Annual Energy Outlook (AEO) 2015. The AEO2016 Reference case was first released on May 17, 2016, too late to be included in the Draft TAR.

The agencies assessed a range of fuel price scenarios included in the AEO2015's reference case, as well as its high fuel price scenario and low fuel price scenario. The agencies also assessed the three corresponding vehicle fleet mix and production volumes associated with each fuel prices scenario. See Table ES-1 of the Draft TAR. The agencies show that these three fuel price scenarios lead to differing projections about the auto industry's achieved CAFE and GHG targets by MY2025, of 47.7 mpg/169 grams/mile (g/mi) to 46.3/175 g/mi to 45.7/178 g/mi under the high, reference, and low fuel price scenarios, respectively.

Additional EPA Response:
EPA further assessed the costs of meeting those fleet-wide standards and the associated projected technology penetrations (see Tables 12.48, 12.49, and 12.50 of the Draft TAR). As shown, each of the fuel price scenarios resulted in average per-vehicle costs and projected technology penetrations that show cost-effective pathways to compliance with the MY2025 standards, largely through production of advanced gasoline vehicles.

13. I am concerned that there is very little analysis of consumer acceptance in the Draft TAR. What is your plan to address this issue in the limited time remaining? How are you going to ensure the affordability of these vehicles for the American consumer?

Joint Response

Chapter 6 of the Draft TAR assesses consumer acceptance of the vehicle technologies expected to be used to meet the MY2022-2025 standards, and finds that to date consumer response to vehicles subject to the standards is positive. Many issues related to affordability were assessed, including effects on low-income households, effects on the used vehicle market, effects on access to credits, and the effects on low-priced cars. That chapter also reflects an exhaustive search of available literature on the issue. As the Draft TAR concludes, while it is challenging to separate the effects of the standards from other market changes, if the standards have affected vehicle affordability, those effects do not appear to have been large enough to be obvious in our considerations of the data.

Additional EPA Response:
There were many public comments on issues of consumers and vehicle affordability from automakers, dealers, consumer groups, environmental NGOs, and others that we carefully assessed and that helped inform our Proposed Determination. EPA has responded to these public comments as part of its Proposed Determination.

Additional NHTSA Response

NHTSA intends to include a discussion and analysis of affordability issues in its upcoming NPRM.

14. During the hearing, many noted how footprint-based standards address shifts in vehicle size and therefore implicitly address manufacturer concerns regarding customers' changing vehicle size preferences. Do footprint-based standards address customer powertrain selection within the same vehicle? Do footprint-based standards address market shifts from cars to similarly sized crossover vehicles that must meet the same standards?

Joint Response

The standards accommodate consumer choice – consumers can still choose vehicles with bigger engines, or choose crossover vehicles rather than cars. As consumers make those choices, it is up to manufacturers to choose how to meet the standards. If some vehicles sold fall short of their targets, manufacturers must decide what other vehicles to sell in order to meet their overall average standard. That has always been the nature of the corporate average fuel economy and GHG vehicle standards.

With regard to consumer powertrain selection within a given vehicle footprint, a manufacturer is not required to meet the exact footprint-based CO_2/fuel economy target of any particular vehicle; rather, the manufacturer meets the standards on a fleet-wide average basis. Thus, within a given footprint, a manufacturer may choose to produce vehicles that are higher or lower than the given footprint-based target, and the program provides a wide range of

flexibilities to achieve compliance, such as averaging and opportunities for credit transfers and credit trading. Specifically, with respect to customer power train selection within the same vehicle, please see the response to Question 1 above, which includes a detailed description of the program elements that provide the automotive company with significant flexibilities for how they can comply with the program, as ultimately it is up to each individual automotive company to decide what powertrain options to offer for sale for any given vehicle. It is important to note that when consumers shift from cars to similarly sized crossover vehicles, that shift may change manufacturers' overall GHG/CAFE standards. NHTSA and EPA have separate standards for cars and trucks, and many crossover vehicles (e.g., especially four-wheel drive crossovers) are defined as trucks, and therefore subject to more lenient targets than similarly-sized cars.

15. **[Question to EPA only]** During the investigation of VW's emissions "cheat devices," EPA stated that the defeat device results in on-road emissions of nitrogen oxides (NOx) that are 10 to 40 times higher than permitted by regulation. Please provide a detailed explanation or description of any assessments EPA has conducted to evaluate the real-world effects of these emissions. In addition, please respond to the following question:

    - What is the difference between the expected U.S. domestic NOx emissions from these vehicles without the defeat device and with the device (i.e., how many more emissions were found to have been emitted from these cars than were expected without the device). Please provide all documentation regarding EPA's analyses.

<u>EPA Response</u>

EPA cannot comment at this time due to the ongoing investigation.

16. Given the amount of subjective modeling in the TAR, should fines and penalties be adjusted where TAR assumptions don't materialize?

Joint Response:
There are many aspects of our modeling that are necessarily based on projections, for example, projections of future fuel prices to assess potential fuel savings and projections of the future vehicle fleet mix to assess potential fleet-wide CO_2 targets. While these projections are important for assessing potential future impacts of the standards, it is important to remember that the standards are performance-based, so manufacturers may choose which technology path makes the most sense for their compliance strategies. More basically, a manufacturer's actual standards are based on the mix of vehicles they produce in a given model year. Thus, whether or not the projections made in the Draft TAR materialize, manufacturers' compliance is based on their actual vehicle production. The most recent EPA Manufacturer Performance Report for MY 2015 documents that manufacturers have been exceeding the GHG standards for four years in a row.

Additional NHTSA Response

NHTSA does not have authority to amend the civil penalty amount beyond the inflation adjustment mandated by the 2015 Inflation Adjustment Act, except as provided in 49 U.S.C. 32912(c). NHTSA's statutory authority requires the Agency to set CAFE standards at the maximum feasible level, and to amend them if they are not maximum feasible. These decisions are informed by information that manufacturers provide to the Agency.

17. What additional steps do you plan to take to further align the varying standards?

EPA Response

Please see EPA response to Representative Guthrie below.

[NHTSA Burgess Q14] What additional steps does NHTSA plan to take to further align with varying standards?

NHTSA Response

There is a petition for rulemaking currently before the Agency asking it to consider granting additional CAFE credits by regulation, which NHTSA is actively considering. The upcoming rulemaking to set CAFE standards for MYs 2022 and beyond will also consider issues such as programmatic flexibilities and what levels of stringency would be maximum feasible for those model years

The Honorable John Shimkus

1. You noted in your testimony that innovation is resulting in over 100 Car, SUV, and Pickup versions on the market today that already meet 2020 or later standards. I'd like to see that list of 100 vehicles and I'd like to know three things:

   A. What percentage of vehicle sales do those 100 cars, SUVs and Trucks represent?

   B. What is the price differential versus other similarly situated cars, SUVs or trucks?

   C. How many of the 100 also meet the EPA and NHTSA requirements by 2025?

EPA Response

As presented in Appendix C, Table 3.1 of the Technical Support Document associated with the Proposed Determination (posted at this site: https://www.epa.gov/sites/production/files/2016-

11/documents/420r16021.pdf), EPA's analysis indicated that there are about 150 model year 2016 vehicle versions (out of a total of 1,328 versions) that already meet their respective footprint-based CO_2 target for model year 2020, which represents about 17 percent of total production; almost 60 versions already meet the 2025 targets, which represent over 3 percent of production. Although final data for model year 2017 are not yet available, it appears that this trend is continuing. EPA does not have pricing information for vehicle models.

NHTSA Response

NHTSA does not track this information because the CAFE standards are average standards. Although CAFE standards are defined in terms of footprint-based functions under which each vehicle version has a target, no single vehicle is required to meet its target, because CAFE standards apply to the average fuel economy of manufacturers' fleets of passenger cars and light trucks. Thus, specific individual vehicles do not meet or fail to meet CAFE standards.

2. Can you please explain how EPA and NHTSA considered how the increased costs of future fuel economy/GHG standards may conflict with a consumer's ability to afford various life- saving vehicle safety technologies that auto manufacturers are currently adding to vehicles? Effectively, when consumers have limited funds to purchase a new car, is EPA and NHTSA presuming that the emissions and fuel economy technology and compliance obligations take priority over other safety technologies? What other consumer needs do the agencies believe should not take priority over fuel economy (e.g. utility)?

Joint Response

EPA and NHTSA believe that the implication that consumers will have to choose between improved fuel economy and safety is a false choice, as there's no reason under our standards that consumers can't continue to choose the vehicle that has the utility, performance, safety, and other attributes that meet their needs. As explained in the Draft TAR, we have not found evidence to date that consumers have needed to compromise on any needs while reducing fuel consumption and greenhouse gas emissions. With regard to how we accounted for safety regulations in our Draft TAR analysis, the agencies assumed as part of the reference case that all currently required safety equipment is included in the vehicles.

Additional NHTSA Response Fuel economy and safety can continue to improve concurrently. New vehicles frequently have more safety features *and* get better fuel economy than prior models, and may also have more of other consumer-desired attributes like towing, hauling, or acceleration. Manufacturers strategize on pricing as they decide how to compete in different market segments. NHTSA's modeling tries to account for manufacturers' interests in maintaining or improving consumer-desired attributes like towing, hauling, and acceleration. We also account for the mass gains likely to result from compliance with upcoming safety standards in our assessment of fuel economy benefits. We are carefully considering TAR

comments on consumer needs and will respond to those comments as part of the upcoming NPRM.

The Honorable H. Morgan Griffith

1. Due to EPA's proposed requirements, truck trailer manufacturers will have to add aerodynamic equipment, with the added weight displacing freight. As trucking companies still must observe weight laws, it is only logical more tractor trailers will be needed to carry the same amount of freight.

   A. Won't more tractor trailers on the road will worsen air quality and safety?

   B. Is it true that NHTSA estimates that an additional 2.7 people will die annually in road deaths as a result of these regulations?

EPA Response

For clarity, this question refers to the Heavy-Duty Phase 2 GHG standards that EPA and NHTSA recently finalized (81 FR 73478, October 25, 2016). That rule is independent of the light-duty vehicle standards assessed in the Draft TAR.

In our analyses for that rule, the agencies recognized that the aerodynamic devices that we believe may be adopted to meet the Heavy-Duty Phase 2 GHG trailer standards would inherently add weight to trailers. We also recognized that for that fraction of trips for which trailer operators load trailers to the maximum legal weight, the relatively small weight of the devices could result in an increase in numbers of trips. For that analysis, we estimate that trailers "weigh out" in that way about one third of overall tractor-trailer trips, and that they "cube out" (that is, reach the maximum volume of the trailer before ethe weight limit is reached) for the remainder of trips.

. At the same time, the rule provides an incentive to reduce the overall weight of their trailers, and the potential positive safety implications of weight reduction efforts could partially or fully offset safety concerns from added weight of aerodynamic devices. In fact, weight reduction incentivized through the Phase 2 trailer program could produce net benefits for both safety and air quality in the longer term due to the potentially greater amount of cargo that could be carried on each and the need for *fewer* trucks on the road.

NHTSA Response

Response to 1.A:

The Phase 2 medium- and heavy-duty fuel efficiency rulemaking assumes that trailer manufacturers will apply aerodynamic devices to their trailers, increasing the aerodynamic efficiency of the trailer, thereby using less fuel. Additionally, the rule considers that some

trailer manufacturers will incorporate lightweight components (e.g., aluminum landing gears and coupler assemblies) into their trailers. The Agencies examined this relationship in the Phase 2 medium- and heavy-duty rulemaking and concluded that the additional weight from aerodynamic fittings could be partially or fully offset by lightweighting. Therefore, both agencies agree that adding aerodynamic components will not necessarily lead to more tractor trailers on the roads.

Response to 1.B

No. The Agencies considered and analyzed the added weight from installing aerodynamic devices on trailers. A commenter to the proposal included an estimate of projected additional fatalities due to increased truck vehicle miles travelled (VMT) and the Agencies noted discrepancies in the commenter's assumptions. The Agencies concluded that integrating lightweight technologies into trailers, which is a means of compliance, could partially or fully offset the safety concerns stemming from the added weight of aerodynamic devices.

2. **[Question to EPA only]** At the Committee hearing, you justified EPA's regulation of trailers as a "self-propelled vehicle" (42 USC 7521(b)) by stating "without a trailer, a truck is not transporting goods. And so we see the trailer as an integral part of the vehicle that is covered in the Clean Air Act." Currently, the truck can't drive itself. So does the EPA take the position under the Clean Air Act that it has the authority to regulate the height, weight, and size of the driver?

3. **[Question to EPA only]** I hope you laughed at the above question. However, isn't that the same reasoning that you used as the basis for regulating trailers?

EPA Response

EPA's rationale for establishing greenhouse gas standards for trailers is more inclusive than the hearing format allowed; we are glad to provide a fuller response here. EPA's basic logic chain is as follows:

- A tractor-trailer together is unquestionably a "motor vehicle," as we explain in detail in the Heavy-Duty Phase 2 final rule. Therefore, EPA is authorized to promulgate emission standards for pollutants emitted by that motor vehicle.
- The Clean Air Act also contemplates emission standards from discrete segments of motor vehicles. See, e.g. 42 USC section 7521 (a)(6) (standards for onboard vapor recovery systems on "new light-duty vehicles"). A trailer is such a discrete component of the tractor-trailer.
- Trailer manufacturers can be required to certify (i.e. demonstrate) compliance with these standards because they meet the definition of "manufacturer" in 42 USC section 7550(1). That definition contemplates that motor vehicles can have more than one manufacturer.
- In fact, EPA's motor vehicle emission standard regulations have long provided 'delegated

assembly' provisions, where a motor vehicle is assembled by different, unrelated entities in discrete segments. These provisions (which antedate the Phase 2 regulations by decades) provide when and how certification responsibilities are allocated when a motor vehicle has multiple, unrelated manufacturers. The requirement in the phase 2 rule that trailer manufacturers certify compliance with the trailer standards is an application of these longstanding rules.

Please see 81 FR at 73512-517 (Oct. 25, 2016) for a fuller explanation.

The Honorable Brett Guthrie

Following a previous hearing on related issues, I submitted questions for the record regarding the "lack of harmonization" between the NHTSA and EPA fuel economy programs. Based on feedback I've gotten from the field, my takeaway is that we don't have "one" program in practice. The manufacturers are still regulated by two federal agencies under two programs that do not appear to be fully harmonized.

However, the Administration said in its Regulatory Announcement of August 2012 regarding the 2017-2025 requirements: "Continuing the National Program ensures that auto manufacturers can build a single fleet of U.S. vehicles that satisfy requirements of both federal programs as well as California's program." In several of the responses to my previous questions for the record, NHTSA stated that "manufacturers may build a single fleet to meet all requirements." And, "Because of the different statutory authorities, the [NHTSA and EPA] programs differ in some ways, but are structured to be harmonized such that manufacturers may build a single fleet of vehicles to meet all requirements."

1. Is there a situation where a manufacturer could meet the NHTSA requirement and not meet the EPA's requirement or vice versa?

2. Is it not automatic or "ensured" that one fleet of vehicles will comply with both programs- as the Regulatory Announcement stated?

3. Is my understanding correct that the two programs claim about the same fuel savings through 2021, NHTSA at 65.3 billion gallons and EPA at 65.6 billion gallons?

4. If the answer to number three is yes, both programs claim about the same fuel savings, then what could be the public policy benefit of a manufacturer being able to build a fleet that meets one agency's requirements but still having to pay a fine to the other program for the same fleet, as I understand can happen in practice?

5. Are your agencies aware of legislative provisions that would help correct the harmonization inconsistencies?

6. Will your agencies commit to working with Congress to enact these changes?

Joint Response

The National Program is possible because of the close relationship between reducing CO_2 tailpipe emissions and improving fuel economy. The more fuel efficient a vehicle is, the less fuel it burns to travel a given distance; the less fuel it burns, the less CO_2 is emitted in traveling that distance. Therefore, the same sets of technologies that improve fuel efficiency also at the same time reduce CO_2 emissions (note there are some technologies that reduce GHG emissions but do not improve fuel efficiency, for example, reduction of air conditioning refrigerant emissions). In this way, the National Program allows auto manufacturers to use a common set of technologies to simultaneously address both related issues of reducing CO_2 emissions and improving fuel efficiency. (See 75 FR 25327, May 7, 2010).

Going back to the first time the agencies established standards for the 2012-2016 model years, EPA and NHTSA were clear that there were some important differences in the statutory authorities (see 75 FR 25330, May 7, 2010), and that the stringency of the respective standards was in fact established to account for differences in air conditioning improvements. The agencies have worked to establish a national program subject to the differences in statutory authorities.

Additional EPA Response

One area where the statutory authorities are different between the agencies relates to potential penalties for non-compliance. The Clean Air Act allows EPA considerable discretion in assessing penalties, and, in the event of a compliance action arising out of the same facts and circumstances, EPA could consider CAFE fines when determining appropriate remedies for the EPA case.

EPA would be happy to assist in providing technical support to potential legislative provisions related to harmonization, should Congress request it.

Additional NHTSA Response

Response to 1:

We understand that because EPA's program contains more flexibilities than the CAFE program, some manufacturers find it easier to comply with EPA's standards in certain model years. However, under the joint National program, a manufacturer may build a fleet of vehicles that complies with both standards. The manufacturer has the flexibility to choose how to comply.

Response to 2:

It is up to manufacturers how they choose to comply. If a manufacturer relies heavily on EPA-only flexibilities for GHG compliance, it may be more difficult to meet NHTSA's CAFE standards, but that does not absolve the manufacturer of its legal requirement to comply with the CAFE standards or pay civil penalties.

Response to 3:

In the 2012 Final Rule, considering manufacturers' ability to employ certain flexibilities, NHTSA estimated total fuel savings between model years 2017 – 2021, relative to the continuation of the MY 2016 standard, of about 65.3 billion gallons under the 2008 baseline, and about 66.5 billion gallons under the 2010 baseline. See Table I-9 of the Final Rule (77 Fed. Reg. at 62657, Oct. 15, 2012).

Response to 4:

NHTSA's obligation is to set standards that it believes, based on analysis, are maximum feasible, following the requirements of our statute.

Response to 5:

NHTSA is aware that proposals have been drafted.

Response to 6:

The Agency is available to provide technical assistance on amendments to the CAFE program statutes.

RUBBER
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December 23, 2016

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The Honorable Gina McCarthy
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Air and Radiation Docket and Information Center
U.S. Environmental Protection Agency
Mail code: 28221T
1200 Pennsylvania Ave. NW.
Washington, DC 20460

The Honorable Mark Rosekind, Ph.D.
Docket Management Facility, M-30
U.S. Department of Transportation
West Building, Ground Floor, Rm. W12-140
1200 New Jersey Avenue SE.,
Washington, DC 20590

Dear Administrator McCarthy and Administrator Rosekind:

RE: Petition for Reconsideration and Amendment of Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles—Phase 2, Final Rule, 81 Fed. Reg. 73478 (October 25, 2016), RIN 2060–AS16; RIN 2127–AL52 (Docket Numbers EPA–HQ–OAR–2014–0827 and NHTSA–2014–0132; FRL–9927–21–OAR)

I. Introduction

The Rubber Manufacturers Association ("RMA")[1] petitions the Environmental Protection Agency (EPA) and National Highway Traffic Safety Administration (NHTSA) to reconsider the above-captioned final rule. As companies that manufacture tires for use on new medium and heavy-duty vehicles, RMA members have a direct interest in this rulemaking. Overall, RMA supports the goals of this rulemaking and appreciates the opportunity to partner with other stakeholders in contributing to better fuel economy and GHG emission reductions. RMA also appreciates several changes to the rule, addressing issues raised in RMA comments on the proposed rule and notice of data availability, such as the changes incorporating tire-pressure monitoring systems ("TPMS") into the greenhouse gas emission model ("GEM") and basing EPA's recall authority on the plain language of the Clean Air Act. But, RMA believes that on several other issues such as, lab alignment, standards for non-box and non-aero box trailers, SAE J1025 and J2452, and speed limited tires, the agencies should reconsider their approach.

[1] RMA represents the tire companies manufacturing tires in the United States. RMA's membership includes: Bridgestone Americas; Continental Tire the Americas, LLC; Cooper Tire & Rubber Company; Kumho Tire U.S.A., Inc.; Michelin North America, Inc.; Pirelli Tire North America, Inc.; Sumitomo Rubber North America, Inc.; The Goodyear Tire & Rubber Company; Toyo Tire Holdings of Americas Inc. and Yokohama Tire Corporation.

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II. The Agencies Should Establish a Reference Laboratory

In the proposed rule, the agencies proposed to continue to allow use of either STL or Smithers in testing based on their conclusion that lab-to-lab variability is "very small" and "would not significantly affect RRc values." 80 Fed. Reg. 40243. Also, in the preamble discussion for the final rule, the agencies mistakenly noted that they "*did not receive any comments on the issue*." 81 Fed. Reg. 73625. Emphasis added. But, as the agencies noted in the response to comment document, RMA submitted extensive comments and data advocating for the establishment of an alignment machine and challenging the Agencies' assertion that lab-to-lab variability is very small. RMA Comments on Proposed Rule at 2-9 (Oct. 1, 2015). For example, RMA provided test data showing that while the labs are correlated, they do not produce the same results, as some tires perform better at one lab, while others perform better at the other.

While the agencies, in the response to comment document, seemed to acknowledge potential compliance concerns, noting that tire manufacturers may select trailer tire rolling resistance level (TRRL) values identical to the measured rolling resistance or any higher value, RMA members may still feel compelled to correlate to both labs to avoid any potential compliance issue. Response to Comment Document at 1820. Additionally, at section 1037.520(c)(2), the regulation requires that rolling resistance test results not be "biased low," but the agencies do not define or explain what that means. Even small differences in test results can be very meaningful to a tire company, particularly in business, auditing, or compliance contexts. It would be helpful for the agencies to establish a reference machine to address this issue.

III. The Agencies Should Reconsider the Rolling Resistance Limit Values for Non-Box and Non-Aero Box Trailers

In the proposed rule, the agencies proposed to set rolling resistance limit values for non-aero and non-box trailer tires at 6.0 for 2017, 5.1 for 2018-2021, and 4.7 for 2024-2027. In the final rule, the agencies split out the standards for non-box trailers and for non-aero box vans. The final rule raised the limit values for non-box trailers from 5.1 to 6.0 for 2018-2020 and from 4.7 to 5.1 for 2024+. However, the non-aero box standards were unchanged from the proposed values of 5.1 for 2018-2020 and 4.7 for 2021+. In the discussion about non-box trailers, the agencies noted that while they agree with RMA and Michelin comments that "the baseline tires for non-box trailers should have a higher rolling resistance" than what was proposed, the agencies asserted that they "did not receive any that included C_{RR} data." 81 Fed. Reg. 73652. This appears to be an oversight by the agencies as this issue does seem to be addressed in the response to comment document.

In RMA's comments, RMA recommended the following limit values for non-aero and non-box trailer tires: 7.0 in 2018, 6.5 in 2021, 6.1 in 2024, and 5.8 in 2027. RMA based these recommended values on rolling resistance data collected on a range of tires used for non-aero vans and non-box trailers, which were included in RMA's comments. See RMA Comments on Proposed Rule at 21-25 (Oct.

2015); RMA Comments on NODA p. 3-4 (Apr. 2016). RMA also noted that the application of low rolling resistance tires to non-box and non-aero trailers may present conflicts in ultimate service and application. For example, trailers used on variable terrain often demand deeper tread depths and sidewall scuffing resistance such that typical highway-type low rolling resistance tire may not provide optimal service performance. In addition to potential performance issues, RMA members may not have enough lead time to meet these standards for non-box trailers and non-aero box vans. It would be helpful for the agencies to raise the rolling resistance limit values to align them with rolling resistance values that can be feasibly met in the future.

IV. The Agencies Should Reconsider Incorporating the SAE J1025 Standard

While RMA appreciates the agencies' attempt to clear up confusion regarding use of the terms "static loaded radius" and "loaded radius," the SAE J1025 standard for revolutions per mile is problematic. 81 Fed. Reg. 74076. In RMA's comments on the proposed rule, RMA noted that truck tire revolutions per mile can be measured using SAE 1025-2012, but RMA also highlighted that this test method could cause variations among similar tires depending on load and pressure, tread wear, tread geometry, driving and braking torque, and type and condition (wet, dry) of the pavement. RMA Comments on Proposed Rule at 30. The implications here are that vehicle manufacturers may ask RMA members to conduct additional testing based on a standard that has historically been based on engineering practices. RMA members are aware of only one facility that conducts this SAE J1025 testing and RMA is concerned that there may be limited capacity as well as a significant financial burden associated with such testing.

RMA advocates that the agencies allow tire manufacturers to rely on engineering practices to develop an estimate for static loaded radius and revolutions per mile. For example, the Tire and Rim Association has published "Guidelines for Static Loaded Radius (SLR_R) for Radial Truck-Bus Tires." In addition, The European Tyre and Rim Technical Organization (ETRTO) published a calculation for Theoretical Rolling Circumference. Tire manufacturers commonly use such engineering estimates. Tire companies also use other similar, equivalent formulas. RMA is interested in discussing with the agencies ways to incorporate accepted engineering practices that would provide the agencies with information essentially equivalent to results from J1025 testing.

V. The Agencies Should Reconsider Incorporating the SAE J2452 Standard

The agencies essentially created a modified version of the SAE J2452 coast down tire rolling resistance test for use with truck tires that is likely not technically valid and is outside the scope of the original SAE J2452 standard. 81 Fed. Reg. 73626, 73676, 74085. Beyond the agencies' generic discussion about coast down test procedure improvements, the agencies never discussed the specific possibility of relying on the J2452 standard in the proposed rule or in the notice of data availability. RMA members are concerned that they were not provided notice of the agencies consideration of the J2452 standard. The issue here is that the agencies have taken a test for passenger tires and applied it to truck tires,

changing loads and pressures, but not the warm-up time or adjusting the coast down profile to match that of truck tires.

It is not appropriate to apply a test method designed for light duty vehicles and apply it to medium and heavy duty vehicles or their components without evaluating the method's application to other vehicles, considering adaptations and validating the method. Given these issues, RMA members are concerned about the reliability and accuracy of such testing and therefore RMA recommends that this test be removed from the final rule. RMA is interested in discussing with the agencies alternative ways to provide the agencies with information essentially equivalent to results from J2452 testing.

VI. The Agencies Should Reconsider Removing the Exemption for 55-mph Speed Rated Tires

In the proposed rule, the agencies proposed to discontinue the criterion for exemption based solely on use of tires with maximum speed rating at or below 55 mph. 80 Fed. Reg. 40295. RMA commented that these tires typically are designed to achieve tire performances such as high load carrying capacity and durability that are specific to the vehicles on which they are installed, which often are used in off-road applications. RMA also noted that a tire that is appropriate for use on a vehicle used for off-road applications would not see a meaningful fuel consumption benefit due to the use of low rolling resistance tires as its typical drive cycle is at low speeds on aggressive terrain. Also, a speed restricted tire would not be suitable for use on a vehicle that does not specify these tires.

While acknowledging RMA's comments, the agencies ultimately were not persuaded that it would be detrimental for a vehicle to drive above 55 mph with speed-limited tires. The agencies' incorrectly assumed that vehicles that have the potential to travel at high speeds over 55 mph may be fitted with 55-mph speed rated tires that could later be removed. This assumption is mistaken because 55-mph speed rated tires are only installed on vehicles that do not have the capacity to safely travel at speeds over 55 mph.

As the Federal Motor Carrier Safety Administration noted in its recently issued final rule Parts and Accessories Necessary for Safe Operation, vehicles should be equipped with tires that have the proper speed rating for the vehicle's intended use because operating a vehicle at speeds that exceed the specified tire speed rating could create a potential safety issue. 81 Fed. Reg. 47728. Moreover, FMCSA adopted language in 49 CFR § 393.75 prohibiting the use of speed-restricted tires labeled for 55 mph or less, in accordance with S6.5(e) of FMVSS No. 119, on vehicles that operate at speeds that exceed the rated limit of the tires. Id. Therefore, the concern that this type of tire could be installed on a vehicle that could exceed such speed limits is not founded because speed restricted tires would not perform appropriately with and are prohibited on vehicles that exceed such limits.

VII. The Agencies Should Consider Directing Consumers to RMA Member Websites for Information on Rolling Resistance

In the proposed rule, the agencies proposed to determine that tire rolling resistance measurements would not be considered confidential business information. Ultimately, the agencies chose not to pursue a public database through this rulemaking. As RMA commented, RMA members consider rolling resistance test data to be confidential business information and while RMA appreciates the interest EPA expresses in educating vehicle operators about rolling resistance, releasing this data would not contribute to that goal. Instead, RMA recommended that the agencies consider an alternate approach, which RMA affirms again, that directing consumers to RMA member website fuel economy calculators would be valuable as these websites are good sources of information for tire replacements and comparisons.

VIII. The Agencies Should Ensure that Tire-Pressure Monitoring Systems for Trailers Provide a Visual Telltale to the Driver While the Vehicle Is in Motion

In the proposed rule, the agencies did not include a greenhouse gas emission model (GEM) reduction value for tire pressure monitoring systems (TPMSs). 80 Fed. Reg. 40187, 40218. But, the agencies requested comment on this approach and sought data from those in support of a GEM reduction value. In comments, RMA expressed support for a GEM credit for TPMS similar to the credit proposed for automatic tire inflation systems (ATIS). RMA also cited to a NHTSA study on the effectiveness of FMVSS 138, which mandates that TPMS be installed as original equipment in all passenger cars, multipurpose passenger vehicles and trucks and buses with a gross vehicle weight rating (GVWR) of 10,000 pounds or less and manufactured on or after September 1, 2007. In the NHTSA study, the agency found that the presence of TPMS led to a 55.6 percent reduction in the likelihood that a vehicle would have one tire that is significantly underinflated (25 percent or greater) and that TPMS saves $511 million in fuel costs across the vehicle fleet. RMA Comments at 25-28.

In the final rule, the agencies adopted provisions allowing manufacturers of tractors, trailers, and vocational vehicle chassis to input a percent decrease in overall fuel consumption and CO_2 emissions into GEM if the vehicle includes either an ATIS or a tire pressure monitoring system. 81 Fed. Reg. 73545, 73592-93. The agencies noted that they found the comments submitted, including those from RMA to be persuasive. The RMA commends the agency for adding tire pressure monitoring systems in the Phase 2 GEM. The use of these systems will provide a substantial improvement in vehicle efficiency as well as improve tire performance and extend tire life through more frequent and proper maintenance.

RMA, however, recommends that the agencies ensure that TPMS visual telltales for trailers are provided to the driver while the vehicle is in use. The final rule states that heavy duty trailers must use TPMSs "as specified in S4.3 and S4.4 of 49 CFR 571.138," citing to FMVSS 138, a TPMS standard for passenger vehicles, trucks and buses. 49 CFR Section 535.5(e)(2)(ii)(A). FMVSS 138 S4.3 and S4.4 requires that the low pressure warning telltale be mounted inside the occupant compartment, in front of and in clear view of the driver, and illuminated when the ignition locking system is on, whether or not the engine is running.

EPA-HQ-2018-001738: Production Set #1

The issue here is that, unlike passenger or vocational vehicles, trailers make up part of a unit and due to the design of the vehicle manufacturers may seek to utilize TPMS at the tire not visible to the driver while driving. RMA cautions against such systems as they may not provide an adequate warning of pressure loss and could eliminate the benefits of the system. Instead, as required under FMVSS 138, RMA recommends that any tire pressure monitoring system use low pressure warning and malfunction telltales in clear view of the driver while the vehicle is in operation, such as communication/telematics within the cab or by additional telltale visual warnings.

IX. The Agencies Should Provide Relief for Adjustable Spread Axle Trailers

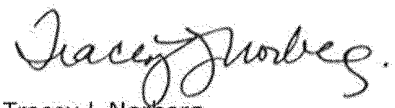
In the response to comment document, the agencies noted that because trailers with large spread axles are more susceptible to scrubbing, trailers with axle spreads greater than 120 inches are exempted from the rule. Response to Comments at 1035. But, the regulatory exemption states that "in the case of adjustable axle spacing, this refers to the closest possible axle positioning," meaning that if it is possible to narrow the axle gap to under 120 inches, the exclusion would not apply. 40 C.F.R. § 1037.5(h)(3). This regulatory exemption does not appear to have been raised by the agencies in the proposed rule or notice of data availability.

While RMA appreciates the agencies providing some relief for spread axle trailers, the agencies should expand the exemption to more broadly cover trailers with adjustable axles, which make up the great majority of spread axle trailers. As the agencies acknowledged, scrubbing is an issue for spread axle trailers, but the relief provided does not completely address the issue. RMA looks forward to discussing potential solutions with the agencies.

X. Conclusion

RMA appreciates the opportunity to submit this petition and looks forward to working with the agencies on potential changes to the regulation.

Sincerely,



Tracey J. Norberg
Senior Vice President & General Counsel
Rubber Manufacturers Association

To: Charmley, William[charmley.william@epa.gov]
Cc: Kylie Taylor[kylie.taylor@gladstein.org]
From: JoAnne Golden-Stewart
Sent: Fri 3/24/2017 5:45:45 PM
Subject: RE: Connecting you all for ACT Expo

Bill—

We certainly anticipated some reticence since EPA is definitely undergoing some significant changes. We want to wish you best of luck going forward.

Take care,

JoAnne

JoAnne Golden-Stewart

Vice President, Programs

Gladstein, Neandross & Associates
310.573.8551 direct

Ex. 6 - Personal Privacy cell

joanne.golden@gladstein.org

From: Charmley, William [mailto:charmley.william@epa.gov]
Sent: Thursday, March 23, 2017 1:55 PM
To: JoAnne Golden-Stewart <joanne.golden@gladstein.org>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: RE: Connecting you all for ACT Expo

Dear JoAnne,

I apologize for taking so long to get you a response on the invitation to EPA to speak at the ACT Expo in early May.

Unfortunately my team in Ann Arbor will not be able to support this conference. There is a lot going on with EPA in the new Administration, and we are also trying to figure out our overall travel budget for the rest of the year, but without having a full year's budget.

I have spoken with several of my managers and senior staff, and unfortunately we will not be able to come to ACT Expo this year.

Best regards,

Bill

Bill Charmley

Director

Assessment and Standards Division

Office of Transportation and Air Quality

U.S. Environmental Protection Agency

National Vehicle and Fuel Emissions Laboratory

2000 Traverwood Drive

Ann Arbor, MI 48105

desk ph. 734-214-4466

cell ph. 734-545-0333

e-mail: charmley.william@epa.gov

From: JoAnne Golden-Stewart [mailto:joanne.golden@gladstein.org]
Sent: Tuesday, March 07, 2017 11:49 AM
To: Charmley, William <charmley.william@epa.gov>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: RE: Connecting you all for ACT Expo

Bill—

I just wanted to loop back around here—I know things have been insane on your side the past six weeks, but I just wanted to check to see whether you've had any luck securing the speakers that Rich was in coordination with you about for ACT Expo? We plan to announce our full speaker lineup next week and just want to close any remaining gaps we have on the agenda.

JoAnne Golden-Stewart

Vice President, Programs

Gladstein, Neandross & Associates
310.573.8551 direct

Ex. 6 - Personal Privacy cell

joanne.golden@gladstein.org

From: JoAnne Golden-Stewart
Sent: Friday, February 24, 2017 9:20 AM
To: 'Charmley, William' <charmley.william@epa.gov>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: RE: Connecting you all for ACT Expo

Bill—

I hope you're doing well. I wanted to loop back around here as we are hoping to announce our full agenda lineup of speakers next week. Have you been able to identify someone on your side yet?

JoAnne Golden-Stewart

Senior Program Manager

Gladstein, Neandross & Associates
310.573.8551 direct

Ex. 6 - Personal Privacy cell

joanne.golden@gladstein.org

From: JoAnne Golden-Stewart
Sent: Wednesday, February 15, 2017 10:37 AM
To: Charmley, William <charmley.william@epa.gov>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: RE: Connecting you all for ACT Expo

Thanks, Rich Moving you to bcc so as to not clutter your inbox. Bill, we'd love to pick back up on the request to have someone join us for ACT from your team. As Rich indicated earlier, we have a couple of spots we'd love to secure someone for on both Wednesday, May 3, 2017 and

Thursday, May 4, 2017. Do you have any suggestions on who would be good here? He said you were running it by a few folks, so I just wanted to loop back around.

As a reminder, the speaking spots are listed below.

May 3, 2017

8:30 a.m. - 10:45 a.m.

GENERAL SESSION

Medium- and Heavy-Duty General Session

9:45 a.m. - Focusing Freight on Efficiency

Building on the opening session, this panel will provide additional details on industry efficiency improvement projects and strategies, as well as insight into how these near-term efforts then connect to the longer-term evolution to truck platooning, automation and potentially driverless trucks. This session will start off by diving deeper into the EPA's Phase 2 GHG Rule to help fleet customers understand what this regulation will really mean to their future planning and procurement plans. Higher costs; increased vertical integration of truck, engine, and powertrain components; and fewer options from OEMs are expected. With implementation of the trailer standards set to take effect in 2018, and the truck and engines standards in 2021, hear from industry leaders on this session about what these new standards and rules mean to your fleet and future procurement costs and options. Beyond the EPA Phase 2 GHG Rule, get an update on the second round of SuperTruck funding. SuperTruck II projects will research, develop, and demonstrate technologies to improve heavy-truck freight efficiency by more than 100 percent, relative to a manufacturer's best-in-class 2009 truck, with an emphasis on technology cost-effectiveness and performance. Hear which OEMs are participating, what technologies they will be testing, and what goals they hope to achieve.

US EPA (invited)

Volvo (tentatively confirmed; awaiting speaker)

US DOE SuperTruck

NACFE (invited as a moderator)

May 4, 2017

9:00 a.m. - 11:45 a.m.

WORKSHOPS & FORUMS

Ultra Clean Heavy-Duty Vehicle Summit

The heavy-duty vehicle sector is at the dawn of a new era-one characterized by an array of zero emission technology. From full battery electric trucks, buses, and other equipment to hydrogen fuel cell trucks that can travel 1,200 miles, what will the future look like? Not to be left behind, ultra-low emission heavy-duty natural gas and propane autogas engines are here today, and many believe we will see diesel engines fight back in the coming years. Local, state, and federal regulators have noticed these advancements and are charging ahead with low-NOx rule-making efforts at the national level and in California. Meanwhile, leading progressive fleets are making big investments in these zero and near zero emission technologies which, when combined with renewable fuels, can provide a heavy-duty vehicle platform that has virtually no emissions. Find out first-hand how the heavy-duty sector is poised to do a 180 and go from the largest source of regional criteria emissions and greenhouse gas emissions to a sector that contributes almost no harmful air emissions. Hear from leading stakeholders on these fast-paced developments in the market so that you understand what is real, what is happening, and when these products will be required and available.

Regulatory Landscape**:** Matt Spear, US EPA (invited)**;** CARB: invited SCAQMD: invited

Electric: **Andy Swanton, BYD (confirmed)**; Fuso; Trevor Milton, Nikola (confirmed); Michael Simon, Transpower (invitation made)

Gaseous Fuels**:** Joe Thompson Roush, CWI, eControls

Future of Diesel: CARB, Volvo

JoAnne Golden-Stewart

Senior Program Manager

Gladstein, Neandross & Associates
310.573.8551 direct

Ex. 6 - Personal Privacy cell

joanne.golden@gladstein.org

From: Rich Kassel
Sent: Monday, February 13, 2017 11:46 AM
To: Charmley, William <charmley.william@epa.gov>; JoAnne Golden-Stewart <joanne.golden@gladstein.org>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: Connecting you all for ACT Expo

Bill –

I don't recall whether I told you I was leaving GNA when we spoke on February 2 (it wasn't public yet), but I will be leaving Gladstein, Neandross & Associates (GNA) on Wednesday, February 15. It's been a great place to work for 4.5 years, but starting on February 27, I'll be joining Capalino+Company as an executive vice president, directing their new Environment, Energy, and Sustainability practice. (When I land there, I'll send you more details about what I'll be doing).

JoAnne Golden-Stewart, with assistance from Kylie Taylor, will be organizing the ACT Expo sessions that we discussed earlier this month. They will be your contact points for all things ACT Expo going forward, and are great to work with. I hope you get to ACT this year, and if you do, I'm sure you'll enjoy working with them.

Let's talk soon, but I wish you all the best in the meantime,

Rich

Rich Kassel

Senior Vice President
Gladstein, Neandross & Associates

5 Penn Plaza, 23rd Floor

New York, NY 10001

212.849.6861 direct

Ex. 6 - Personal Privacy cell

rich.kassel@gladstein.org

GLADSTEIN, NEANDROSS & ASSOCIATES

CLEAN TRANSPORTATION & ENERGY CONSULTANTS

High Horsepower "HHP" Summit | *October 11-13, 2016 – Chicago, IL*

Rethink Methane Symposium | *February 21-22, 2017 – Sacramento, CA*

Advanced Clean Transportation "ACT" Expo | *May 1-4, 2017 – Long Beach, CA*

This communication may contain material that is confidential or legally privileged. It is intended solely for the use of the intended recipient(s). Any interception, review, reliance, disclosure, distribution or forwarding by anyone other than the intended recipient and without express permission is strictly prohibited.

To: Charmley, William[charmley.william@epa.gov]
Cc: Olechiw, Michael[olechiw.michael@epa.gov]; Bolon, Kevin[Bolon.Kevin@epa.gov]; Moran, Robin[moran.robin@epa.gov]; Barba, Daniel[Barba.Daniel@epa.gov]
From: Bohac, Stani
Sent: Thur 3/23/2017 6:53:13 PM
Subject: RE: SAE Congress
Toyota papers at 2017 SAE Congress.xlsx
program.pdf

Dear Bill,

Toyota has 46 technical papers, 1 oral only paper, and 1 panel discussion in the 2017 SAE Congress program. Most of these are relevant to the work of OTAQ. Attached is a list of papers, including day, time, paper number, and title. I've also attached the latest version of the full program.

I hope your meeting with Toyota in D.C. goes well.

Best regards,

Stani

From: Charmley, William
Sent: Thursday, March 23, 2017 12:54 PM
To: Bohac, Stani <bohac.stani@epa.gov>
Cc: Olechiw, Michael <olechiw.michael@epa.gov>; Bolon, Kevin <Bolon.Kevin@epa.gov>; Moran, Robin <moran.robin@epa.gov>; Barba, Daniel <Barba.Daniel@epa.gov>
Subject: RE: SAE Congress

Stani,

By COB on Friday, can you let me know a count of how many technical papers Toyota is presenting at the world congress this year?

We have a meeting in D.C. with senior execs from Toyota, and I want to make sure that they are aware that the EPA technical team will be looking carefully at the many papers Toyota is presenting.

Thanks

bill

Bill Charmley

Director

Assessment and Standards Division

Office of Transportation and Air Quality

U.S. Environmental Protection Agency

National Vehicle and Fuel Emissions Laboratory

2000 Traverwood Drive

Ann Arbor, MI 48105

desk ph. 734-214-4466

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e-mail: charmley.william@epa.gov

From: Bohac, Stani
Sent: Tuesday, March 14, 2017 12:44 PM
To: Charmley, William <charmley.william@epa.gov>
Cc: Olechiw, Michael <olechiw.michael@epa.gov>; Salazar-Greene, Natalie <salazar-greene.natalie@epa.gov>; Caffrey, Cheryl <caffrey.cheryl@epa.gov>
Subject: SAE Congress

Dear Bill,

SAE Congress is April 4-6 this year. Per Mike O.'s request, attached is a spreadsheet showing LDVSEC and NCAT plans to attend and information on the 4 papers are being presented from these two centers. Also attached is the Technical Program. I'll work with Natalie and SAE on registration and filling out a training form.

Would you like me to ask the other centers in ASD to send me the same information and coordinate registration and training forms? Or is there someone in your IO that would like to do this?

Let me know if there is anything else I can do.

-Stani

Stani Bohac

Light-Duty Vehicles and Small Engines Center, U.S. EPA

National Vehicle and Fuel Emissions Laboratory

2000 Traverwood Drive

Ann Arbor MI 48105

Tel: +1-734-214-4277

Mobile: +1-734-846-3743

bohac.stani@epa.gov

To: Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Charmley, William[charmley.william@epa.gov]; Cook, Leila[cook.leila@epa.gov]; Lie, Sharyn[Lie.Sharyn@epa.gov]; Shelby, Michael[Shelby.Michael@epa.gov]; Helfand, Gloria[helfand.gloria@epa.gov]
From: Simon, Karl
Sent: Fri 3/10/2017 4:47:27 PM
Subject: FYI - this may come in handy at some point given focus on jobs question
AEM-Economic-Research-Report.pd.pdf

In my very quick scan, did not see environmental rules mentioned in this report.

Driving Innovation in Clean Transportation

To: Charmley, William[charmley.william@epa.gov]
Cc: Kylie Taylor[kylie.taylor@gladstein.org]
From: JoAnne Golden-Stewart
Sent: Tue 3/7/2017 4:49:28 PM
Subject: RE: Connecting you all for ACT Expo

Bill—

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JoAnne Golden-Stewart

Vice President, Programs

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310.573.8551 direct

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joanne.golden@gladstein.org

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Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: RE: Connecting you all for ACT Expo

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NACFE (invited as a moderator)

May 4, 2017

9:00 a.m. - 11:45 a.m.

WORKSHOPS & FORUMS

Ultra Clean Heavy-Duty Vehicle Summit

The heavy-duty vehicle sector is at the dawn of a new era-one characterized by an array of zero emission technology. From full battery electric trucks, buses, and other equipment to hydrogen fuel cell trucks that can travel 1,200 miles, what will the future look like? Not to be left behind, ultra-low emission heavy-duty natural gas and propane autogas engines are here today, and many believe we will see diesel engines fight back in the coming years. Local, state, and federal regulators have noticed these advancements and are charging ahead with low-NOx rule-making efforts at the national level and in California. Meanwhile, leading progressive fleets are making big investments in these zero and near zero emission technologies which, when combined with renewable fuels, can provide a heavy-duty vehicle platform that has virtually no emissions. Find out first-hand how the heavy-duty sector is poised to do a 180 and go from the largest source of regional criteria emissions and greenhouse gas emissions to a sector that contributes almost no harmful air emissions. Hear from leading stakeholders on these fast-paced developments in the market so that you understand what is real, what is happening, and when these products will be required and available.

Regulatory Landscape**:** Matt Spear, US EPA (invited)**;** CARB: invited SCAQMD: invited

Electric: **Andy Swanton, BYD (confirmed)**; Fuso; Trevor Milton, Nikola (confirmed); Michael Simon, Transpower (invitation made)

Gaseous Fuels**:** Joe Thompson Roush, CWI, eControls

Future of Diesel: CARB, Volvo

JoAnne Golden-Stewart

Senior Program Manager

Gladstein, Neandross & Associates
310.573.8551 direct

Ex. 6 - Personal Privacy cell

joanne.golden@gladstein.org

From: Rich Kassel
Sent: Monday, February 13, 2017 11:46 AM
To: Charmley, William <charmley.william@epa.gov>; JoAnne Golden-Stewart <joanne.golden@gladstein.org>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: Connecting you all for ACT Expo

Bill –

I don't recall whether I told you I was leaving GNA when we spoke on February 2 (it wasn't public yet), but I will be leaving Gladstein, Neandross & Associates (GNA) on Wednesday, February 15. It's been a great place to work for 4.5 years, but starting on February 27, I'll be joining Capalino+Company as an executive vice president, directing their new Environment, Energy, and Sustainability practice. (When I land there, I'll send you more details about what I'll be doing).

JoAnne Golden-Stewart, with assistance from Kylie Taylor, will be organizing the ACT Expo sessions that we discussed earlier this month. They will be your contact points for all things ACT Expo going forward, and are great to work with. I hope you get to ACT this year, and if you do, I'm sure you'll enjoy working with them.

Let's talk soon, but I wish you all the best in the meantime,

Rich

Rich Kassel

Senior Vice President
Gladstein, Neandross & Associates

5 Penn Plaza, 23rd Floor

New York, NY 10001

212.849.6861 direct

Ex. 6 - Personal Privacy cell

rich.kassel@gladstein.org

-

GLADSTEIN, NEANDROSS & ASSOCIATES
CLEAN TRANSPORTATION & ENERGY CONSULTANTS

High Horsepower "HHP" Summit | *October 11-13, 2016 – Chicago, IL*

Rethink Methane Symposium | *February 21-22, 2017 – Sacramento, CA*

Advanced Clean Transportation "ACT" Expo | *May 1-4, 2017 – Long Beach, CA*

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To: Charmley, William[charmley.william@epa.gov]
Cc: Moulis, Charles[moulis.charles@epa.gov]; Simon, Joseph[Simon.Joseph@epa.gov]
From: Spears, Matthew
Sent: Tue 3/7/2017 4:45:20 PM
Subject: For Bill's review: 1st draft of EPA response to Rep Loudermilk letter re: HD Phase 2 trailers (control AL-17-000-4973)
AL-17-000-4973 Correspondence.pdf
AL-17-000-4973 Control Slip.pdf
AL-17-000-4973 draft Resp Ltr -v1 MWS.docx

Hi Bill,

Please find attached for your review both an incoming letter from Rep Loudermilk regarding the HD Phase 2 trailer program and our first draft of a potential EPA response to his letter.

Response

The response has been officially assigned to OAR's AA, currently Sarah Dunham.

Timing

While we only received this letter on Monday, Chuck reminded me that the response due date is currently tomorrow Wednesday March 8, 2017. Do you recommend that we request a time extension so that we can have more time for review and concurrence up to OAR's AA?

NHTSA

Also, I am sending this information to Jim Tamm and Ryan Hagen for NHTSA-DOT's optional feedback, but I am not asking for NHTSA-DOT concurrence on our response.

Regards,

Matthew Spears

Center Director, Heavy-Duty Diesel Standards U.S. Environmental Protection Agency

2000 Traverwood Dr.

Ann Arbor, MI 48105

spears.matthew@epa.gov

w. 734-214-4921

m. 734-276-7079

From: Simon, Joseph
Sent: Monday, March 06, 2017 8:53 AM
To: Spears, Matthew <spears.matthew@epa.gov>; Moulis, Charles <moulis.charles@epa.gov>
Subject: New Control AL-17-000-4973

Hello Matt and Chuck,

New Control

3/6/17 17014	AL-17-000-4973	RECONSIDER THE GREENHOUSE GAS PHASE 2 RULE'S EFFECTS ON TRUCK TRAILERS	U.S. House of Rep Congress (9) Loudermilk, Barry,Griffith, Morgan,Cramer, Kevin,Babin, Brian,Fortenberry, Jeff,Westerman, Bruce,Noem, Kristi L.,Farenthold, Blake,Yoho, Ted	HDONC	Matt Spears, Chuck Moulis	3/7-3/8

Please see attached.

Any questions, please let me know.

Thanks

Joe Simon

Senior Service America, Inc.

Supporting the USEPA through a Cooperative Agreement

under the Senior Environmental (SEE) Program

Assessment and Standards Division

Direct line 734-214-4835

Email: Simon.Joseph@epa.gov

To: Charmley, William[charmley.william@epa.gov]; Wysor, Tad[wysor.tad@epa.gov]; Moran, Robin[moran.robin@epa.gov]
From: Sutton, Tia
Sent: Tue 1/3/2017 10:57:30 PM
Subject: FW: LRM [CIB-114-70] TRANSPORTATION and EPA Questions for the Record on the CAFE Program and Greenhouse Gas Emissions Standards for Motor Vehicles
QFRs EPA+NHTSA Responses 12-20-16_draft for OMB_CIB -- rsy edits 30 Dec ....docx

Hey y'all,

Sorry for the obnoxious urgent flag, but we need to respond by first thing tomorrow morning on this one.

Ex. 5 - Deliberative Process

Thanks!

-Tia

From: Haman, Patricia
Sent: Tuesday, January 03, 2017 5:39 PM
To: Sutton, Tia <sutton.tia@epa.gov>
Cc: Niebling, William <Niebling.William@epa.gov>; Davis, Matthew <Davis.Matthew@epa.gov>
Subject: FW: LRM [CIB-114-70] TRANSPORTATION and EPA Questions for the Record on the CAFE Program and Greenhouse Gas Emissions Standards for Motor Vehicles

Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

Thanks, Pat

Patricia Haman

Office of Congressional Affairs

U.S. EPA

202-564-2806

Hi Patricia,

Earlier today DOT sent me the attached response to passback for the DOT/EPA QFRs on the CAFE Program and Greenhouse Gas Emissions Standards for Motor Vehicles. However, there are a few comments from OSTP and OMB's Environment Branch that were not addressed and require EPA's response. Could EPA please address these comments before I send the revised document out for further review?

Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

Thank you,

BARRY LOUDERMILK
11TH DISTRICT, GEORGIA

WEBSITE
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135 CHEROKEE AVENUE, SUITE 122
CARTERSVILLE, GA 30120
(770) 429-1776

600 GALLERIA PARKWAY, SE
SUITE 120
ATLANTA, GA 30339
(770) 429-1776

February 24, 2017

Hon. Scott Pruitt
Administrator-Nominee, Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Dear Administrator Pruitt:

Congratulations on your recent confirmation as Administrator of the Environmental Protection Agency (EPA). In this new role, we, the undersigned, write to raise your awareness and convey our concern regarding the inclusion of the heavy duty trailer industry in the joint EPA – National Highway Traffic Safety Administration (NHTSA) October 25, 2016 Final Rule entitled, *Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles – Phase 2* (GHGP2).

Our concerns contain two elements. First is the EPA's illegal extension of its legislative authority under the Clean Air Act by qualifying a trailer as a "new motor vehicle". Second, if the EPA can prove legislative authority does actually exist to uphold this classification, we hold grave concerns regarding the regrettable – and even tragic – consequences. For these reasons, we ask that you review the record and consider whether it would be appropriate to eliminate the heavy-duty trailer manufacturing industry from the rulemaking in order to correct the agency's legislative overreach.

Under the Clean Air Act (42 USC 7521(a)), Congress required the EPA to regulate "any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which ... may reasonably be anticipated to endanger public health or welfare." Under 42 USC 7550(b), motor vehicle "means any self-propelled vehicle designed for transporting persons or property on a street or highway." Indisputably, trailers are inert, cannot move under their own power, do not have an engine and do not generally produce emissions. Therefore, including truck trailers under the Clean Air Act's pollutant regulations is an abuse of the EPA's jurisdictional claim.

Through the SmartWay Program, a currently voluntary program to assist in the implementation of the GHGP2, the EPA sets forth trailer engineering standards to improve a truck operator's fuel economy in a heavy-duty tractor-trailer combination traveling at highway speed. Although data supports the gains from increased efficiency of these standards for tractor-trailers traveling at highway speed, data submitted to the EPA from a range of commenters reportedly demonstrates that the same benefits are not achieved when traveling at less-than-highway speeds. The American Trucking Association states that at least half of all tractor-trailer usage occurs not on highways but at lesser speeds around towns and cities. This means that at least half of tractor trailers will be required to make the engineering adjustments to comply with regulation but will not experience increased efficiency.

However, adding weight to trailers by altering their engineering to meet standards will displace cargo in order for the truck operator to remain in compliance with Gross Vehicle Weight laws on the roads. This will

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paradoxically require more tractor-trailers on the road just to maintain current freight transportation levels, which will clearly have the net effect of increasing greenhouse gas (GHG) rather than reducing it. Despite the trucking industry's admirable safety record, more tractor-trailers compiling more miles and facing more accident exposure will unnecessarily lead to more traffic fatalities. Toward this end, NHTSA states on pages 356 and 357 of the joint EPA-NHTSA rulemaking:

> *"According to FMCSA's 2014 annual report for 'Large Truck and Bus Crash Facts' indicates (sic) there are less than 1.67 fatalities per 100 million vehicle miles traveled (VMT) by combination trucks in the U.S. for 2014. When multiplied by an estimated 184 million additional truck miles due to weighed-out trucks, the result is an increase of about 3 fatalities, or 2.7 fatal crashes."*

Trucking operators capable of benefitting under SmartWay already enjoy economic and competitive incentives. It would seem that those who cannot achieve improved efficiencies because they too frequently travel at lesser speeds have no reason to add costly add-ons to trailers that, additionally, will increase crash fatalities.

It is our belief and aim to bring to your attention that the EPA does not possess the Clean Air Act authority in this instance. Trailers do not self-propel or generate emissions, and trailer manufacturers do not construct motor vehicles. If they are treated as such and are required to meet the same requirements, costs will increase and GHG will worsen, rather than improve. Of greatest concern is that more people will unnecessarily die each year as a result of this ill-considered rule. The House of Representatives took action to prevent these tragic outcomes by including an EPA prohibition on spending to implement, enforce, et al. the rulemaking against trailer manufacturers within the House FY 2017 Interior, Environment and Related Agencies appropriations bill. Regardless, as Administrator of the EPA, we hope you will review this matter as quickly as possible and address the concerns we have raised. For more information, please do not hesitate to contact Aubrey Neal in Representative Barry Loudermilk's office at Aubrey.Neal@mail.house.gov.

Sincerely,

Barry D. Loudermilk
Member of Congress

Morgan Griffith
Member of Congress

Kevin Cramer
Member of Congress

Brian Babin
Member of Congress

Jeff Fortenberry
Member of Congress

Bruce Westerman
Member of Congress

Kristi Noem
Member of Congress

Blake Farenthold
Member of Congress

Ted S. Yoho, DVM
Member of Congress

WCXâ„¢ 17: SAE World Congress Experience

Technical Session Schedule

As of 03/22/2017 07:40 pm

Tuesday, April 4

Occupant Protection: Rear Impact, Side Impact and Rollover

Session Code: ***SS506***

Room 140 C ***Session Time:*** ***8:00 a.m.***

This session will have presentations that address advancing the science of occupant safety in vehicle rear impact, side impact, and rollover collisions.

Organizers - *Jarrod Carter, Origin Engineering; Tara LeeAnne Arthur Moore, JP Research Inc.; Donald Parker, Exponent Failure Analysis; Jeffery W. Sankey, Transportation Research Center Inc.*

Time	Paper No.	Title
8:00 a.m.	2017-01-1460	***Folded Pelvis-Thorax Side Airbag Modeling with CFD Approach and Implementation in Full Vehicle Crash Analysis*** *Nitesh Jadhav, Linda Zhao, Senthilkumar Mahadevan, Bill Sherwood, Krishnakanth Aekbote, Ford Motor Company; Dilip Bhalsod, LSTC*
8:30 a.m.	2017-01-1458	***Vehicle Rear Impacts and Spinal Disc Herniations in Occupants: Is there a Basis for Causation?*** *Tack Lam; B. Johan Ivarsson, Biomechanics Scientific LLC*
9:00 a.m.	2017-01-1457	***Development of A New Dynamic Rollover Test Methodology for Heavy Vehicles*** *Jingwen Hu, Nichole Ritchie Orton, Univ of Michigan - Ann Arbor; Rebekah Gruber, US Army TARDEC; Ryan Hoover, Kevin Tribbett, CAPE Testing; Jonathan Rupp, Emory University; Dave Clark, Risa Scherer, US Army TARDEC; Matthew Reed, Univ of Michigan - Ann Arbor*
9:30 a.m.		***BREAK***
10:00 a.m.	2017-01-1459	***A Development of the New Mechanism for Preventing Door Opening in Side Impact Test*** *HangMook Kim, Jae Kyu Lee, Jin Sang CHUNG, Hyundai Motor Company*

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Mobility Issues for an Aging Population

Session Code: ***SS304***

Room 140 C ***Session Time:*** ***3:00 p.m.***

Aging mobility is important to the automotive industry for the following reasons:
â€¢ 37% of the population is over age 50
â€¢ 52% of vehicles sold in 2012 were to > 55 years of age consumers.
â€¢ A 65 year old is 4x more likely to buy a new car than a 25 year old.

Presentations will cover how this group will have unique issues associated with it that will need to be addressed by the automotive industry as they design vehicles for this ever growing population.

Organizers - *Rich Cregar, Penske Truck Leasing Corporation; Raghu Echempati, Kettering Univ.; Joseph Hassan, Human And Safety Systems Co.; Robert C. Lange, Exponent; Daniel J. Selke, Mercedes-Benz USA LLC*

Chairpersons - *Daniel J. Selke, Mercedes-Benz USA LLC*

Time	Paper No.	Title

2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1396***	***Accelerator-to-brake pedal transition movements during on-road stopping in an older population*** *Sarah S. Sharpe, Robyn Brinkerhoff, Caroline Crump, Douglas Young, Exponent Inc.*
3:30 p.m.	***2017-01-1397***	***Senior drivers, cyclists and pedestrian behavior related with traffic accidents and injuries.*** *Alba Fornells, NÃºria Parera, Adria Ferrer, Applus + Idiada Spain; Anita Fiorentino, Fiat Chrysler Automobiles*

Planned by Human Factors Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Human Factors in Seating Comfort (Part 1 of 2)

Session Code: ***SS303***

Room 140 D ***Session Time:*** ***8:00 a.m.***

Designing vehicles with good ergonomics is one of the many factors needed to achieve high customer satisfaction. A basic source for comfort (or discomfort) lies in the vehicleâ€™s seats. To design for seat comfort requires knowledge of the size of the driver, the structure of the seat, the position of the seat in the vehicle and the trip duration. Papers offers in this session could include topics such as seat back angle, vehicle packaging and trip duration.

Organizers - *Jennifer M. Badgley, General Motors; Henry E. Hojnacki, Woodbridge Group; Bonita J. Thomas, Fiat Chrysler Automobiles*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1388***	***A Review of Human Physiological, Psychological & Human Biomechanical Factors on Perceived Thermal Comfort of Automotive Seats.*** *S. M. Akbar Berry, Michael Kolich, Johnathan Line, Ford Motor Company; Waguih ElMaraghy, University of Windsor*
8:30 a.m.	***ORAL ONLY***	***Development of a Methodology Focused on Selecting Comfortable Seat Cover for Thermal Comfort Improvement*** *Se Jin Park, Korea Res. Inst. of Standards & Science; Hyun-kyu Park, Hyundai Motor Group; Murali Subramaniyam, Seunghee Hong, Damee Kim, Korea Res. Inst. of Standards & Science*
9:00 a.m.	***2017-01-1391***	***Complete Seat Load Deflection Testing Methodologies*** *Heather Bronczyk, Michael Kolich, Ford Motor Company; Marie-Eve Cote, Lear Corporation*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1395***	***A Study of the Effect of Air-Mat Seat Pressure Level on Seating Comfort*** *Se Jin Park, Murali Subramaniyam, Seunghee Hong, Damee Kim, Korea Research Institute of Standards & Science; Tae Hyun Kim, Dong Woo Cho, Bum Il Shim, Daewon Kang Up Co., Ltd.*
10:30 a.m.	***2017-01-1390***	***Effects of Seat and Sitter Dimensions on Pressure Distribution in Automotive Seats*** *Monica Lynn Haumann Jones, Jangwoon Park, Sheila Ebert-Hamilton, K. Han Kim, Matthew P. Reed, Univ of Michigan - Ann Arbor*

Planned by Human Factors Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Human Factors in Seating Comfort (Part 2 of 2)

Session Code: ***SS303***

Room 140 D ***Session Time:*** ***1:00 p.m.***

Designing vehicles with good ergonomics is one of the many factors needed to achieve high customer satisfaction. A basic source for comfort (or discomfort) lies in the vehicle's seats. To design for seat comfort requires knowledge of the size of the driver, the structure of the seat, the position of the seat in the vehicle and the trip duration. Papers offers in this session could include topics such as seat back angle, vehicle packaging and trip duration.

Organizers - *Jennifer M. Badgley, General Motors; Henry E. Hojnacki, Woodbridge Group; Bonita J. Thomas, Fiat Chrysler Automobiles*

Time	Paper No.	Title
1:00 p.m.	***ORAL ONLY***	***Rear Armrest Design Considerations for China Market*** *Luther Wang, Jacob Shen, Ford Motor Company*
1:30 p.m.	***2017-01-1392***	***Determining the Parameters of Feeling for a Mechanism of Seat Adjustment*** *Abhilash CHOUBEY, RAJESH PAL, Kotanageswararao Puli, Pankaj Maheshwari, Sandeep Raina, Maruti Suzuki India Ltd.*
2:00 p.m.	***2017-01-1389***	***Study and proposals for improving static comfort in automotive seating*** *Ankush Kamra, Sandeep Raina, Pankaj Maheshwari, Abhishek Agarwal, Prasad Latkar, Maruti Suzuki India Ltd.*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1393***	***A New Multi-Adjustable Experimental Seat for Investigating Biomechanical Factors of Sitting Discomfort*** *Georges Beurier, Michelle Cardoso, Xuguang Wang, Univ Lyon, UniversitÃ© Lyon 1, IFSTTAR*
3:30 p.m.	***ORAL ONLY***	***ABC's of Seat Comfort: a Historical Perspective*** *Scott Allen Ziolek, Hyundai-Kia America Technical Center Inc.*

Planned by Human Factors Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Occupant Protection: Accident Reconstruction (Part 1 of 3)

Session Code: ***SS500***

Room 140 E ***Session Time:*** ***8:00 a.m.***

This session focuses on the latest research related to methods and techniques for reconstructing vehicular crashes involving wheeled and tracked vehicles, pedestrians, and roadside features. Emphasis is placed on experimental data and theoretical methods that will enable reconstructionists to identify, interpret and analyze physical evidence from vehicular crashes.

Organizers - *Christopher D. Armstrong, Mecanica Scientific Svcs Corp.; Alan F. Asay, Armstrong Forensic Engineers Inc.; Jarrod Carter, Origin Engineering; Geoff Germane, Germane Engineering; Richard Frank Lambourn, Transport Research Laboratory, Ltd.; L. Daniel Metz, Metz Engineering & Racing; Nathan A. Rose, Kineticorp LLC*

Time	Paper No.	Title

8:00 a.m.	***2017-01-1410***	***Driving a Car with a Body Wedged Underneath*** *Richard F Lambourn, James Manning, Transport Research Laboratory Ltd*
8:30 a.m.	***2017-01-1413***	***Video Analysis of Motorcycle and Rider Dynamics During High-Side Falls*** *Nathan A. Rose, Neal Carter, David Pentecost, Alireza Hashemian, Kineticorp LLC*
9:00 a.m.	***2017-01-1414***	***Application of 3D Visualization in Modeling Wheel Stud Contact Patterns with Rotating and Stationary Surfaces*** *William Bortles, David Hessel, William Neale, Kineticorp LLC*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1419***	***Real-time Crash Detection and Its Application in Incident Reporting and Accident Reconstruction*** *Smruti Panigrahi, Jianbo Lu, Sanghyun Hong, Ford Motor Company*
10:30 a.m.	***2017-01-1420***	***Characterization of Janus V3 After Market Vehicle Camera with Global Positioning and 3-Axis Accelerometer*** *Kirsten White, Raymond Merala, Talas Engineering Inc.*
11:00 a.m.	***2017-01-1422***	***An Evaluation of Two Methodologies for Lens Distortion Removal when EXIF Data is Unavailable*** *Toby Terpstra, Seth Miller, Alireza Hashemian, Kineticorp LLC*

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Occupant Protection: Accident Reconstruction (Part 2 of 3)

Session Code: ***SS500***

Room 140 E ***Session Time:*** ***1:00 p.m.***

This session focuses on the latest research related to methods and techniques for reconstructing vehicular crashes involving wheeled and tracked vehicles, pedestrians, and roadside features. Emphasis is placed on experimental data and theoretical methods that will enable reconstructionists to identify, interpret and analyze physical evidence from vehicular crashes.

Organizers - *Christopher D. Armstrong, Mecanica Scientific Svcs Corp.; Alan F. Asay, Armstrong Forensic Engineers Inc.; Jarrod Carter, Origin Engineering; Geoff Germane, Germane Engineering; Richard Frank Lambourn, Transport Research Laboratory, Ltd.; L. Daniel Metz, Metz Engineering & Racing; Nathan A. Rose, Kineticorp LLC*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1415***	***Crush Energy and Stiffness in Side Impacts*** *John D. Struble, Exponent, Inc.; Donald E. Struble*
1:30 p.m.	***2017-01-1416***	***Application of Lateral Pole Impact Force-Displacement Data to the Reconstruction of Side Impacts with Narrow Objects*** *B. Nicholas Ault, Daniel E. Toomey, Design Research Engineering*
2:00 p.m.	***2017-01-1423***	***Rear Override Impact Analysis of Full-Size and Light Duty Pickup Trucks for Crash Reconstruction*** *Alan F. Asay, Asay Engineering LLC; Christopher D. Armstrong, Bradley Higgins, John Steiner, Mecanica Scientific Svcs Corp.*
2:30 p.m.		***BREAK***

3:00 p.m.	***2017-01-1425***	***Accuracy of the Momentum Energy Restitution Method for Offset Inline Minor Rear-End Impacts*** *Brian Jones, Michael Calabro, Justin Brink, Scott Swinford, American Bio Engineers*
3:30 p.m.	***2017-01-1411***	***Bayesian Estimation of Driversâ€™Gap Selections and Reaction Times in Left-Turning Crashes from Event Data Recorder Pre-Crash Data*** *Gary A. Davis, Univ. of Minnesota-Twin Cities*
4:00 p.m.	***ORAL ONLY***	***Technical Keynote:*** ***Automotive Crash Testingâ€“ Changes Are Coming; Ready?*** *Gerald Goupil, Calspan Corporation*

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Advances in Alternative Energy Sources for Sustainable Development in the Transportation Sector (Part 1 of 2)

Session Code: ***SDP103***

Room 140 F ***Session Time:*** ***8:00 a.m.***

This session explores advances in the creation of sustainable energy sources and their usage in the transportation sector. Topics can include research and in-production technology used to produce renewable energy sources and materials. A discussion on lifecycle analysis of the energy sources is also highly recommended. The SDPC encourages usage of papers, presentations, and panels in this session to display leading edge technologies and practical tools for engineers.

Organizers - *Navtej Singh, Navistar Inc.; Michael Jon Grichnik, Rahul Jhavar, Caterpillar Inc.; Deepak Gupta, Wichita State University*

Chairpersons - *Navtej Singh, Navistar Inc.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1281***	***CFD Simulation to Understand Auto-Ignition Characteristics of Dual Fuel Strategies using High- and Low-Octane Fuels: A Step Towards The Octane-On-Demand Engine*** *Rajesh Kumar, Olivier Laget, Guillaume Pilla, Guillaume Bourhis, Roland Dauphin, Loic de Francqueville, IFP Energies nouvelles, Institut Carnot IFPEN TE; Jean-Pascal Solari, Aramco*
8:30 a.m.	***2017-01-1287***	***Modular Concept of a Cost-Effective and Efficient On-Site Hydrogen Production Solution*** *Markus Sartory, Markus Justl, Patrick Salman, Alexander Trattner, Manfred Klell, HyCentA Research GmbH; Ewald WahlmÃ¼ller, Fronius International GmbH*
9:00 a.m.	***2017-01-1288***	***Colorimetric Sensor for Facile Identification of Methanol-Containing Gasoline*** *Noriko Shisa, Toyota Motor Corporation; Shinsuke Ishihara, Yougui Huang, National Institute for Materials Science; Mikio Asai, Toyota Motor Corporation; Katsuhiko Ariga, National Institute for Materials Science*
9:30 a.m.	***2017-01-1283***	***Performance of an Indirect Injected Engine Operated with ULSD#2 Blended with Fischer-Tropsch Synthetic Kerosene*** *Valentin Soloiu, Remi Gaubert, Martin Muinos, Jose Moncada, Thomas Beyerl, Gustavo Molina, Johnnie Williams, Georgia Southern University*
10:00 a.m.		***BREAK***

10:30 a.m.	***2017-01-1289***	***Laminar Burning, Combustion and Emission Characteristics of Premixed Methane- Dissociated Methanol-Air Mixtures*** *Zinong Zuo, Yiqiang Pei, Jing Qin, Ruoyu Jia, Xiang Li, Tianjin University; Zhang Song ZHAN, Chongqing Changan Automobile Co Ltd; Bin Liu, Tie Gang Hu, Jing Zhong, Changan Automobile Co Ltd*

Planned by Sustainable Development Program Committee / Engineering Meetings Board

Tuesday, April 4

Occupant Protection: Biomechanics

Session Code: ***SS501***

Room 140 F ***Session Time:*** ***1:00 p.m.***

The Biomechanics session presents new research on automotive occupant kinematics, human injury biomechanics, and human tolerance in an automotive environment. This includes new methodologies in the study of human injury, studies of human interaction with occupant protection systems, technological advances in physical and virtual anthropomorphic test devices, and other experimental, analytical and modeling studies on the biomechanics of human injury.

Organizers - *Elizabeth Mary Fievisohn, Virginia Tech.; Jacob L. Fisher, Exponent Inc.; Warren N. Hardy, Virginia Tech.; Michael Royce*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1431***	***A Study of Hybrid III 5th Percentile Female ATD Chest Accelerometers to Assess Sternum Compression Rate in Chest on Module Driver Out-of-Position Evaluations*** *Ke Dong, Brian Putala, Kristen Ansel, General Motors Company*
1:30 p.m.	***2017-01-1428***	***Automating Regional Rib Fracture Evaluation in the GHBMC Detailed Average Seated Male Occupant Model*** *Berkan Guleyupoglu, Ryan Barnard, F. Scott Gayzik, Wake Forest Univ School of Medicine*
2:00 p.m.	***2017-01-1434***	***Heart-Rate Monitoring Using Single Camera*** *Dongran Liu, Marcos Paul Gerardo-Castro, Bruno Costa, Yi Zhang, Ford Motor Company*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1432***	***Analysis of Driver Kinematics and Lower Thoracic Spine Injury in World Endurance Championship Race Cars during Frontal Impacts*** *Tadasuke Katsuhara, Yoshiki Takahira, Shigeki Hayashi, Yuichi Kitagawa, Tsuyoshi Yasuki, Toyota Motor Corp.*
3:30 p.m.	***2017-01-1430***	***Considerations for Head-Injury Categorization via NASS Analysis*** *Tony R. Laituri, Scott G. Henry, Ford Motor Company*
4:00 p.m.	***2017-01-1433***	***Replicating Real-World Friction of Motorcycle Helmet Impacts and Its Effects on Head Injury Metrics*** *Enrique Bonugli, Biodynamic Research Corp.; Joseph Cormier, Biodynamic Research Corp; Matthew Reilly, Biomedical Engineering, Ohio State University; Lars Reinhart, Biodynamic Research Corp*
4:30 p.m.	***2017-01-1429***	***Evaluation of Biofidelity of the Human Body Model Morphed to Female with Abdominal Obesity in Frontal Crashes*** *Sung Rae kim, Inju Lee, Hyung joo Kim, Hyundai Motor Company*

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Occupant Protection: Safety Test Methodology

Session Code: ***SS508***

Room 140 G ***Session Time:*** ***1:00 p.m.***

This session presents papers in testing and modeling of safety-related technologies, covering (1) reconstruction of pediatric occupant kinematics in side impact, (2) data-mining design method, (3) small overlap sled test method, (4) comparative analysis of angular rate/acceleration calculations, (5) lower extremity injury from occupant-interior geometry assessment, (6) dynamic axial collapse of adhesively bonded hat-section steel column, and (7) strain-rate effect on Jute-polyester composites.

Organizers - *Clifford C. Chou, Wayne State University; Anindya Deb, Indian Institute of Science; P. Miller, MGA Research Corp.; Feng Zhu, Embry Riddle Aeronautical University*

Chairpersons - *Yibing Shi, FCA US LLC; Feng Zhu, Embry Riddle Aeronautical University*

Time	Paper No.	Title
1:00 p.m.	2017-01-1462	**Reconstruction of Pediatric Occupant Kinetic Responds Using Finite Element Method in a Real-world Lateral Impact Accident** *Haiyan Li, Tianjin University of Science and Technology; Xin Jin, Wayne State University; Hongfei Zhao, Shihai Cui, Tianjin University of Science and Technology; Binghui Jiang, King H. Yang, Wayne State University*
1:30 p.m.	2017-01-1463	**A New Data-Driven Design Method for Thin-Walled Vehicular Structures Under Crash Loading** *Xianping Du, Feng Zhu, Embry Riddle Aeronautical University; Clifford C. Chou, Wayne State University*
2:00 p.m.	2017-01-1466	**Component Test Fixture to Improve SOI Results** *Claudia De La Torre, Applus IDIADA; Ravi Tangirala, Michael Guerrero, Hyundai Motor Co; Andreas Sprick, Applus IDIADA*
2:30 p.m.		**BREAK**
3:00 p.m.	2017-01-1465	**Six-Degree-of-Freedom Accelerations: Linear Arrays Compared with Angular Rate Sensors in Impact Events** *William R. Bussone, JP Research Inc.; Joseph Olberding, Michael Prange, Exponent Inc*
3:30 p.m.	2017-01-1461	**Prediction of the Behaviors of Adhesively Bonded Steel Hat Section Components under Axial Impact Loading** *Sanketh Gowda, Anindya Deb, Goutham Kurnool, Indian Institute of Science; Clifford Chou, Wayne State University*
4:00 p.m.	2017-01-1467	**Effect of Strain Rate on Mechanical Responses of Jute-Polyester Composites** *Ashok Mache, Vishwakarma Institute of Info Technology; Anindya Deb, Indian Institute of Science; Clifford Chou, Wayne State University*

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Vehicle Aerodynamics (Part 1 of 6): Aerodynamics Development

Session Code: ***SS800***

Room 141 ***Session Time:*** ***8:00 a.m.***

Paper offers on the following topics are welcome: test facilities, unsteady aerodynamics, fuel economy, cooling airflow, fundamental aerodynamics and aerodynamics development.

Organizers - *Gregory Fadler, FCA US LLC; Adrian P. Gaylard, Jaguar Land Rover; Arturo Guzman, FCA US LLC; James T. McKillen, Honda; Kurt Zielinski, Honda R & D Americas Inc.*

Time	Paper No.	Title
8:00 a.m.	2017-01-1512	**Validation of Aerodynamic Simulation and Wind Tunnel Test of the New Buick Excelle GT** *Fuliang Wang, Zhangshun Yin, Shi Yan, Jia Zhan, Pan Asia Technical Automotive Center Co; Heinz Friz, Bo Li, Weiliang Xie, Exa Corporation*
8:30 a.m.	2017-01-1513	**Optimization of Active Grille Shutters Operation for Improved Fuel Economy** *Young-Chang Cho, Chin-Wei Chang, Andrea Shestopalov, Edward Tate, Exa Corp.*
9:00 a.m.	2017-01-1522	**The Aerodynamic Development of the New Audi Q5** *Thomas Blacha, Moni Islam, Audi AG*
9:30 a.m.		**BREAK**
10:00 a.m.	2017-01-1531	**A Study of Drag Reduction Devices for Production Pick-up Trucks** *Keiichi Taniguchi, Akiyoshi Shibata, Mikako Murakami, Munehiko Oshima, Nissan Motor Co., Ltd.*
10:30 a.m.	2017-01-1535	**Accurate Fuel Economy Prediction via a Realistic Wind Averaged Drag Coefficient** *Luca Dalessio, Bradley Duncan, Chinwei Chang, Joaquin Ivan Gargoloff, Ed Tate, Exa Corporation*
11:00 a.m.	2017-01-1538	**Truck Rear View Mirror Drag Reduction Using Passive Jet Boat Tail Flow Control** *Jiaye Gan, Longxian Li, Gecheng Zha, University of Miami; Craig Czlapinski, Navistar Inc*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00576, and also individually. T purchase visit collections.sae.org

Planned by Vehicle Aerodynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Vehicle Aerodynamics (Part 2 of 6): Motorsports and Experimental Technologies

Session Code: ***SS800***

Room 141 ***Session Time:*** ***1:00 p.m.***

Paper offers on the following topics are welcome: test facilities, unsteady aerodynamics, fuel economy, cooling airflow, fundamental aerodynamics and aerodynamics development.

Organizers - *Adrian P. Gaylard, Jaguar Land Rover; Raymond Leto, TotalSim, Ltd.; Todd Lounsberry, FCA US LLC; Sriram S. Pakkam, Ford Performance Vehicles; Thomas N. Ramsay, Honda; H. Robert (Bob) Welge; Kurt Zielinski, Honda R & D Americas Inc.*

Time	Paper No.	Title
1:00 p.m.	2017-01-1546	**Aerodynamic Analysis of Grand Prix Cars Operating in Wake Flows** *Joshua Newbon, David Sims-Williams, Durham University; Robert Dominy, Northumbria University*
1:30 p.m.	2017-01-1516	**Closed Wheel Race Vehicle Aerodynamic Lift-Off** *Daniel B. Honeycutt, Richard Childress Racing; Mesbah Uddin, UNC Charlotte Motorsports Engineering*

2:00 p.m.	***2017-01-1547***	***Turbulence Models and Model Closure Coefficients Sensitivity of NASCAR Racecar RANS CFD Aerodynamic Predictions***
		Chen Fu, Mesbah Uddin, Clay Robinson, UNC Charlotte Motorsports Engineering; Arturo Guzman, David Bailey, FCA US LLC
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1534***	***General Motorsâ€™New Reduced Scale Wind Tunnel Center***
		Nina Tortosa, David Schroeck, General Motors LLC; Tony Nagle, Guy Flynt, Jacobs
3:30 p.m.	***2017-01-1527***	***The Recent Upgrade of the Model Scale Wind Tunnel of University of Stuttgart***
		Felix Wittmeier, FKFS
4:00 p.m.	***2017-01-1518***	***On the Effects of Wind Tunnel Floor Tangential Blowing on the Aerodynamic Forces of Passenger Vehicles***
		Emil Ljungskog, Simone Sebben, Chalmers University of Technology; Alexander Broniewicz, Christoffer LandstrÃ¶m, Volvo Cars
4:30 p.m.	***2017-01-1530***	***Effect of Vortex Generator on Flow Field Quality in 3/4 Open Jet Automotive Wind Tunnel***
		Di Bao, Qing Jia, Zhigang Yang, Tongji University

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00576, and also individually. T purchase visit collections.sae.org

Planned by Vehicle Aerodynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Steering and Suspension Technology Symposium (Part 1 of 2): Steering Topics

Session Code: ***SS600***

Room 142 A ***Session Time:*** ***8:00 a.m.***

The purpose of this session is to provide a forum for presentations on steering and suspension related topics as it applies to ground vehicles. Papers for this session should address new approaches as well as advances in application of steering, suspension related technologies.

Organizers - *Timothy Drotar, Ford Motor Company; Raghu Echempati, Kettering Univ.; Scott L. Radabaugh, FCA US LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1489***	***Reduction of Steering Effort in the Event of EPAS Failure using Differential Braking Assisted Steering***
		Duanxiang Zhang, Bo Lin, Ahmet Kirli, Chinedum Okwudire, University of Michigan
8:30 a.m.	***2017-01-1485***	***2-Drive Motor Control Unit for Electric Power Steering***
		Mikihiro Hiramine, Yoshitaka Hayashi, Takashi Suzuki, DENSO Corporation
9:00 a.m.	***2017-01-1482***	***Steering Torque Disturbance Rejection***
		Jens Dornhege, Simon Nolden, Martin Mayer, Ford Motor Company
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1481***	***Study of Active Steering Algorithm Logic in EPS Systems by Detecting Vehicle Driving Conditions***
		Kyung-bok Lee, Sanghyuk Lee, Namyoung Kim, Bong Soo Kim, Tae soo Chi, Hyundai Motor Company; Do young Kim, Hyundai Mobis Company

10:30 a.m.	***2017-01-1493***	***A Model Based Approach for Electric Steering Tuning to Meet Vehicle Steering Performance Targets*** *Dexin Wang, Yiqin Mao, Timothy Drotar, Frank Esser, Hessel van Dijk, Michel Paas, Ford Motor Company*
11:00 a.m.	***2017-01-1494***	***Studies on Steering Feeling Feedback System Based on Nonlinear Vehicle Model*** *Weinan Tao, Bingzhao Gao, Hongqing Chu, Mengjian Tian, Hong Chen, Jilin University*

Planned by Steering and Suspension Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Steering and Suspension Technology Symposium (Part 2 of 2): Suspension Topics

Session Code: ***SS600***

Room 142 A ***Session Time:*** ***1:00 p.m.***

The purpose of this session is to provide a forum for presentations on steering and suspension related topics as it applies to ground vehicles. Papers for this session should address new approaches as well as advances in application of steering, suspension related technologies.

Organizers - *Robert Ackley, Ford Motor Company; Raghu Echempati, Kettering Univ.; Prashant Patel, Tenneco Inc.*

Chairpersons - *Robert Ackley, Ford Motor Company*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1484***	***Evolution of the Ride Comfort of Alfa Romeo Cars since 1955 until 2005*** *Giampiero Mastinu, Mario Pennati, Massimiliano Gobbi, Giorgio Previati, Federico Ballo, Politecnico di Milano*
1:30 p.m.	***2017-01-1490***	***Development of Full Air Pneumatic Suspension Type for Commercial Vehicles*** *Silvia Faria Iombriller, Ford Motor Company*
2:00 p.m.	***2017-01-1491***	***Design of A New Weight and Cost Efficient Torsion Profile for Twistbeam Suspension*** *Manish Kumar Seth, Jens Glorer, Ralf Schellhaas, Ford Motor Company*

Planned by Steering and Suspension Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Vehicle Dynamics, Stability and Control (Part 1 of 5)

Session Code: ***SS900***

Room 142 B ***Session Time:*** ***8:00 a.m.***

This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of passenger cars, heavy trucks, and wheeled military vehicles. This session addresses active and passive safety systems to mitigate rollover, yaw instability and braking issues; driving simulators and hardware-in-the-loop systems; suspension kinematics and compliance, steering dynamics, advanced active suspension technologies; and tire force and moment mechanics.

Organizers - *W. Riley Garrott, National Hwy Traffic Safety Admin; Paul Grygier; Gary J. Heydinger, SEA, Ltd.; David R. Mikesell, Ohio Northern Univ.; Sughosh J. Rao, M. Kamel Salaani, Transportation Research Center Inc.*

Chairpersons - *Sughosh J. Rao, Transportation Research Center Inc.; David R. Mikesell, Ohio Northern Univ.*

Time	***Paper No.***	***Title***

8:00 a.m.	***2017-01-1555***	***Vehicle Lane Change Automation with Active Steering - Theoretical Studies and Numerical Investigations*** *MirosÅ‚aw Jan Gidlewski, University of Technology and Humanities; Krystof JANKOWSKI, Magna Closures of America; Andrzej MUSZYÅƒSKI, Automotive Industry Institute; DariuszÅ»ARDECKI, Military University of Technology*
8:30 a.m.	***2017-01-1567***	***Steering Wheel Torque Control of Steer-by-Wire System for Steering Feel*** *Jaepoong Lee, Seoul National University; Sehyun Chang, Hyundai Motor Company; Kwangil Kim, Seoul National University; Bongchoon Jang, Andong National University; Dongpil Lee, Seoul National University; Byungrim Lee, Hyundai Motor Company; Kyongsu Yi, Seoul National University*
9:00 a.m.	***2017-01-1568***	***Study on Energy Loss due to Cornering Resistance in Over-Actuated Vehicles using Optimal Control*** *Sriharsha Bhat, Mohammad Mehdi Davari, Mikael Nybacka, KTH Royal Institute of Technology*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1569***	***Design of an Integrated Yaw-Roll Moment and Active Front Steering Controller using Fuzzy Logic Control*** *Amro Elhefnawy, Alhossein sharaf, Hossam Ragheb, Shawky Hegazy, Military Technical College, Egyptian Armed Forces*
10:30 a.m.	***2017-01-1571***	***Model Based Control to Decouple Electric Steering Feel and Loop Gain*** *Kevin McLaughlin, Jonah Shapiro, HyungJu Kwon, Mobis North America LLC*
11:00 a.m.	***2017-01-1579***	***Investigation of Rollover Prevention with Coupling from Driver Yaw Control Using a Scaled Vehicle*** *Liang-kuang Chen, National Taiwan University of Science & Technology; Chien-An Chen, Automotive Research & Testing Center*
11:30 a.m.	***2017-01-1591***	***A Switched MPC Lateral Steering Controller Which Considered Tracking Quality and Handling Quality for Autonomous Vehicle*** *Haotian Cao, Xiaolin Song, Zhi Huang, State Key Lab of Advance Design & Manufacturing Vehicle Body*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00575, and also individually. T purchase visit collections.sae.org

Planned by Vehicle Dynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Vehicle Dynamics, Stability and Control (Part 2 of 5)

Session Code: ***SS900***

Room 142 B ***Session Time:*** ***1:00 p.m.***

This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of passenger cars, heavy trucks, and wheeled military vehicles. This session addresses active and passive safety systems to mitigate rollover, yaw instability and braking issues; driving simulators and hardware-in-the-loop systems; suspension kinematics and compliance, steering dynamics, advanced active suspension technologies; and tire force and moment mechanics.

Organizers - *W. Riley Garrott, National Hwy Traffic Safety Admin; Paul Grygier; Gary J. Heydinger, SEA, Ltd.; David R. Mikesell, Ohio Northern Univ.; Sughosh J. Rao, M. Kamel Salaani, Transportation Research Center Inc.*

David R. Mikesell, Ohio Northern Univ.; Paul Grygier

Chairpersons -

Time	*Paper No.*	*Title*
1:00 p.m.	***2017-01-1590***	***Vehicle Mass Estimation from CAN Data and Drivetrain Torque Observer*** *Jyotishman Ghosh, Politecnico di Torino; StÃ©phane Foulard, Rafael Fietzek, TU Darmstadt*
1:30 p.m.	***2017-01-1586***	***Accuracy and Robustness of Parallel Vehicle Mass and Road Grade Estimation*** *Narayanan Kidambi, University of Michigan; Gregory M. Pietron, Mathew Boesch, Yuji Fujii, Ford Motor Company; Kon-Well Wang, University of Michigan*
2:00 p.m.	***2017-01-1562***	***Vehicle Modeling for Dynamics Analysis Based on a New Hybrid Algorithm*** *Junyu Zhou, Chao Liu, Jan Kubenz, GÃ¼nther Prokop, Dresden University of Technology*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1558***	***Optimal Tire Force Control & Allocation for Longitudinal and Yaw Moment Control of HEV with eAWD Capabilities*** *Jose Velazquez Alcantar, Francis Assadian, The University of California, Davis; Ming Kuang, Ford Motor Company*
3:30 p.m.	***2017-01-1584***	***Robust Control of a Four-Wheel-Independent-Steering Electric Vehicle for Path Tracking*** *Peng Hang, Xinbo Chen, Fengmei Luo, Shude Fang, Tongji University*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00575, and also individually. T purchase visit collections.sae.org

Planned by Vehicle Dynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Failure Analysis of Materials, Components, and Systems (Part 1 of 2)

Session Code: ***M107***

Room 142 C ***Session Time:*** ***8:00 a.m.***

The mobility industry is constantly challenged to provide customers with the ultimate in reliability and durabilityÂ As a result, when failures occur during testing or real-world service, it is essential to identify the root cause and take appropriate corrective action in a timely mannerÂ Understanding and learning from failures is critical to product successÂ Part 1 of this session will focus on failure analysis of non-metallic materials.

Organizers - *David Elijah Palmer, Bombardier Recreational Product Inc.; Jian Zhou, Cummins*

Time	*Paper No.*	*Title*
8:00 a.m.	***ORAL ONLY***	***Failures of Short Fiber-Reinforced Plastics in Automotive Applications*** *Antoine Rios, The Madison Group*
8:30 a.m.	***2017-01-0317***	***Degradation Analysis of Flexible Film Cables in an Automotive Environment*** *James Henry Wrock, Pengying Niu, Huairui Guo, FCA US LLC*

9:00 a.m.	***2017-01-0325***	***Methods for Analyzing Severity Mitigation in FMEA*** *Samer Abbas, John Joyce, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0319***	***Numerical Fracture Analysis Considering Forming Effect and Element Size Regularization for Automotive Seat Structures*** *Dae-Young Kim, Yongtak Han, Sahnghoon Shin, Hyungsub Yook, Das Corp.*
10:30 a.m.	***2017-01-0322***	***Deriving Failure Rates in a Hierarchy of FMEAs*** *Samer Abbas, John Joyce, Ford Motor Company*

Planned by Metallic Materials Committee / Materials Engineering Activity

Tuesday, April 4

Failure Analysis of Materials, Components, and Systems (Part 2 of 2)

Session Code: ***M107***

Room 142 C ***Session Time:*** ***1:00 p.m.***

The mobility industry is constantly challenged to provide customers with the ultimate in reliability and durabilityÂ As a result, when failures occur during testing or real-world service, it is essential to identify the root cause and take appropriate corrective action in a timely mannerÂ Understanding and learning from failures is critical to product successÂ Part 2 of this session will focus on failure analysis of metallic materials.

Organizers - *David Elijah Palmer, Bombardier Recreational Product Inc.; Jian Zhou, Cummins*

Time	***Paper No.***	***Title***
1:00 p.m.	***ORAL ONLY***	***Reliability of New Pb-Free Solder Alloys in Harsh Environments*** *Babak Arfaei, Ford Motor Co., Ltd.; Eric Cotts, Binghamton University*
1:30 p.m.	***2017-01-0321***	***Effect of Improvements on Crankshaft Pin Grinding and Superfinishing Processes*** *Silvio CÃ©sar Bastos, MWM Navistar Company*
2:00 p.m.	***2017-01-0318***	***Ductile Fracture Prediction of Automotive Suspension Components*** *John George, Kishore Pydimarry, Honda R&D Americas, Inc.; Jeremy Seidt, Kelton Rieske, Ohio State University*

Planned by Metallic Materials Committee / Materials Engineering Activity

Tuesday, April 4

Advanced Catalyst Substrates (Part 1 of 2)

Session Code: ***PFL422***

Room 250 A ***Session Time:*** ***10:30 a.m.***

Presentations in this session cover the systems engineering experiences required to achieve ultra-low emission levels on gasoline light-duty vehicles. Emission system component topics for this session include the development of advanced three-way catalysts, the development of NOx control strategies for gasoline lean burn engines, the application of high cell density substrates to advanced emission systems and the integration of these components into full vehicle emission systems.

Organizers - *Douglas Ball, Umicore Autocat USA Inc.; Rasto Brezny, Michael Geller, Manufacturers of Emission Controls Assoc.; Ronald Heck, RMH Consulting; Joseph E. Kubsh*

Time	***Paper No.***	***Title***

10:00 a.m.		***BREAK***
10:30 a.m.	***ORAL ONLY***	***A Dual SCR Approach for NOx Abatement in Lean Gasoline Engine Exhaust*** *Daniel W. Brookshear, Josh Pihl, Todd Toops, Oak Ridge National Laboratory*
11:00 a.m.	***2017-01-0917***	***New Exhaust Emission Control System with Two A/F Sensors*** *Go Hayashita, Motoki Ohtani, Keiichiro Aoki, Shuntaro Okazaki, Toyota Motor Corporation*
11:30 a.m.	***2017-01-0920***	***Development and Testing of the Ultera^{Â®} Dual Stage Catalyst System on Gasoline-Fueled Light Duty Vehicles (LDVâ€™s)*** *Jean P. Roy, Tecogen, Inc./Ultra Emissions Technologies Ltd.; Ahmed Ghoniem, MIT/Ultra Emissions Technologies Ltd.; Robert Panora, Joseph Gehret, Tecogen, Inc./Ultra Emissions Technologies Ltd.; Bruce Falls, AVL California Technology Center; David Wallace, Daniel Ott, Environex Inc.*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Advanced Catalyst Substrates (Part 2 of 2)

Session Code: ***PFL422***

Room 250 A ***Session Time:*** ***1:30 p.m.***

Presentations in this session cover the systems engineering experiences required to achieve ultra-low emission levels on gasoline light-duty vehicles. Emission system component topics for this session include the development of advanced three-way catalysts, the development of NOx control strategies for gasoline lean burn engines, the application of high cell density substrates to advanced emission systems and the integration of these components into full vehicle emission systems.

Organizers - *Douglas Ball, Umicore Autocat USA Inc.; Rasto Brezny, Michael Geller, Manufacturers of Emission Controls Assoc.; Ronald Heck, RMH Consulting; Joseph E. Kubsh*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0921***	***The Benefits and Challenges Faced by Aftermarket Catalyst Manufacturers in Implementing Advanced Coating Techniques in TWC (Gasoline Applications).*** *Bharadwaj Sathiamoorthy, Alex Graper, Andrew McIntosh, William Kaminski, AP Exhaust Products Inc.*
2:00 p.m.	***2017-01-0919***	***Development of a New Ceramic Substrate with Gas Flow Control Functionality*** *Takeru Yoshida, Hiromasa Suzuki, Toyota Motor Corporation; Yuki Aoki, Toyota Motor North America, Inc.; Naohiro Hayashi, Kenichi Ito, DENSO Corporation*
2:30 p.m.	***2017-01-0922***	***Effect of Ba and La Additives to the Pd layer of a Pd:Rh TWC*** *Akito Takayama, Takahiro Kurokawa, Hiroki Nakayama, Takuya Katoh, Makoto Nagata, N.E. Chemcat Corp.*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0923***	***Impact of Substrate Geometry on Automotive TWC (Three Way Catalyst) Performance*** *Ed Szczepanski, Akinori Koda, Daniel Sweeney, Nick Polcyn, DENSO International America Inc.; Mitsunori Ota, DENSO Corporation*

4:00 p.m.	***2017-01-0918***	***The Development of Low Temperature Three-Way Catalysts for High Efficiency Gasoline Engines of the Future*** *Joseph R. Theis, Andrew Getsoian, Christine Lambert, Ford Motor Company*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

System Integration And Durability (Part 1 of 2)

Session Code: ***PFL421***

Room 250 B ***Session Time:*** ***10:30 a.m.***

This session encompasses studies in the area of exhaust aftertreatment integration and durability. Topics of interest include detailed studies on the caveats of aftertreatement system design, integration and performance. Other topics of interest include studies documenting the challenges and solutions related to durability and robustness of catalytic solutions.

Organizers - *Eric Corrigan, Angus Craig, Corning Inc.; Cary Henry, Southwest Research Institute; Pradeep Prasad, Cummins Inc.*

Time	***Paper No.***	***Title***
10:00 a.m.		***BREAK***
10:30 a.m.	***ORAL ONLY***	***Reduction of In-Use NOx Emissions from Transit Buses through Management of a Selective Catalytic Reduction System*** *Andrew J. Kotz, William Northrop, David Kittelson, Univ of Minnesota-Twin Cities; Niklas Schmidt, Cummins Emission Solutions*
11:00 a.m.	***ORAL ONLY***	***NOx Reduction and N2O Production from an Integrated DOC, DPF and SCR Systems in a Diesel Engine*** *Yongjin Jung, Chong Pyo Cho, Young Dug Pyo, Jingyoung Jang, Gang Chul Kim, Korea Institute of Energy Research; Young Jin Shin, Hanyang University*
11:30 a.m.	***2017-01-0912***	***PQD: Method to Assure Correct Operation of DEF Storage and Delivery System Including DEF Quality Verification*** *Joel Op de Beeck, Scott Mccleary, Plastic Omnium Auto Inergy; Joshua Butler, Inergy Automotive; Issam Djemili, Plastic Omnium Advanced Innovation and Research; Mihai Baja, Plastic Omnium Advanced Innovation*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Advances in Alternative Energy Sources for Sustainable Development in the Transportation Sector (Part 2 of 2)

Session Code: ***SDP103***

Room 250 B ***Session Time:*** ***1:30 p.m.***

This session explores advances in the creation of sustainable energy sources and their usage in the transportation sector. Topics can include research and in-production technology used to produce renewable energy sources and materials. A discussion on lifecycle analysis of the energy sources is also highly recommended. The SDPC encourages usage of papers, presentations, and panels in this session to display leading edge technologies and practical tools for engineers.

Organizers - *Michael Jon Grichnik, Caterpillar Inc.; Deepak Gupta, Wichita State University; Rahul Jhavar, Caterpillar Inc.; Navtej Singh, Navistar Inc.*

Chairpersons - *Michael Jon Grichnik, Caterpillar Inc.*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-1284***	***Design and Simulated Analysis of Regenerative Suspension System with Hydraulic Cylinder, Motor and Dynamo***
		Khushal Ahmad, Monis Alam, Delhi Technological University
2:00 p.m.	***2017-01-1292***	***Influence of Varying Height of Guide Vanes on the Performance of a Diesel Engine Run with Biodiesel***
		Saiful Bari, Univ. of South Australia; Idris Saad, Universiti Teknologi MARA
2:30 p.m.	***2017-01-1285***	***Process Optimization of Biodiesel Production for Mixed Neem (<italic>Azadirachta indica</italic>) <italic>and Sesame (Sesamum indicum L.</italic>) Biodiesel Using Response Surface Methodology Based on Doehlert's Experimental Design***
		Tarun Mehra, Delhi Technological University

Planned by Sustainable Development Program Committee / Engineering Meetings Board

Tuesday, April 4

Thermal Systems for Hybrid and Electric Vehicles

Session Code: ***HX105***

Room 250 C ***Session Time:*** ***8:00 a.m.***

The purpose of this session is to share experiences and lessons learned to advance the technology in the field of thermal management of electric and hybrid vehicle systems. This session presents topics covering both testing and simulation of hybrid and electric vehicle thermal systems.

Organizers - *Ales Alajbegovic, Exa Corporation; Christophe Petitjean, Valeo Thermal Systems; John Rugh, National Renewable Energy Laboratory; Sudhi Uppuluri, Computational Sciences Experts Group*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0186***	***Thermal Load Reduction System Development in a Hyundai Sonata PHEV***
		Cory J. Kreutzer, John Rugh, Jeff Tomerlin, National Renewable Energy Laboratory
8:30 a.m.	***2017-01-0183***	***Integration and Validation of a Thermal Energy Storage System for Electric Vehicle Cabin Heating***
		Mingyu Wang, Timothy Craig, Edward Wolfe, Mahle Behr Troy Inc.; Tim J LaClair, Zhiming Gao, Oak Ridge National Laboratory; Michael Levin, Danrich Demitroff, Furqan Shaikh, Ford Motor Company
9:00 a.m.	***2017-01-0192***	***Energy Efficiency and Performance of Cabin Thermal Management in Electric Vehicles***
		Antti Lajunen, McMaster University
9:30 a.m.	***2017-01-0188***	***Efficient Heat Pump System for PHEV/BEV***
		Yoichiro Higuchi, Toyota Motor Corporation; Hiroyuki Kobayashi, DENSO Corporation; Zhiwei Shan, Mikiharu Kuwahara, DENSO International America Inc.; Yoshiharu Endo, DENSO Corporation; Yuha Nakajima, Toyota Motor Corporation
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0191***	***Modeling Control Strategies and Range Impacts for Electric Vehicle Integrated Thermal Management Systems with MATLAB/Simulink***
		Gene Titov, Jason Aaron Lustbader, National Renewable Energy Laboratory

11:00 a.m.	***2017-01-0184***	***Effects of the Glass and Body Heat Transfer Characteristics of a Hybrid Electric Vehicle on Its Fuel Consumption and Cruising Distance*** *Miyoko Oiwake, Ozeki Yoshiichi, Asahi Glass Co Ltd; Sogo Obata, Hideaki Nagano, Itsuhei Kohri, Tokyo City University*
11:30 a.m.	***2017-01-0185***	***Improved Analytical Model of an Outer Rotor Surface Permanent Magnet Machine for Efficiency Calculation with Thermal Effect*** *Kesavan Ramakrishnan, Politecnico di Milano; Pietro Romanazzi, University of Oxford; Damir Zarko, University of Zagreb; Giampiero Mastinu, Politecnico di Milano; David A. Howey, University of Oxford; Alessio Miotto, BREMBO S.p.A.*

Planned by Thermal Management Activity / EMB Land and Sea Group

Tuesday, April 4

Energy Efficiency of Thermal Systems (Part 1 of 2)

Session Code: ***HX103***

Room 250 C ***Session Time:*** ***1:30 p.m.***

Proper thermal management can significantly contribute to overall system energy efficiency. This session highlights the latest developments in thermal management energy efficiency.

Organizers - *Ronald Semel, Ford Motor Company; Gursaran D. Mathur, CalsonicKansei North America Inc.; Jeffrey Bozeman, General Motors LLC; Andrew Sutherland, BorgWarner Inc.*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0157***	***Investigation of Transmission Warming Technologies at Various Ambient Conditions*** *Forrest Jehlik, Simeon Iliev, Argonne National Laboratory; Eric Wood, Jeff Gonder, National Renewable Energy Laboratory*
2:00 p.m.	***2017-01-0156***	***Diesel Powertrain Energy Management via thermal Management and Electrification*** *Olaf Erik Herrmann, DENSO International Europe; Matteo Biglia, DENSO Thermal Systems SpA; Takashi YASUDA, DENSO Corporation; Sebastian Visser, DENSO International Europe*
2:30 p.m.	***2017-01-0153***	***Waste Heat Recovery for Light-Duty Truck Application Using ThermoAcoustic Converter Technology*** *Dipankar Sahoo, Tenneco Inc.; Adam Kotrba, Tenneco Inc; Tom Steiner, Etalim Inc; Greg Swift, Los Alamos National Laboratory*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0159***	***Fluid Selection and Thermodynamic Analysis of an Electricity-Cooling Cogeneration System Based on Waste Heat Recovery from Marine Engine*** *Peng Liu, Ge-Qun Shu, Hua Tian, Xuan Wang, Dongzhan Jing, State Key Lab Of Engines,Tianjin Univ.*
4:00 p.m.	***2017-01-0154***	***Evaluation of Exhaust Heat Recovery System Effectiveness in Engine Friction Reduction and Fuel Economy Improvement for Indian Hatchback*** *Sudhi Uppuluri, Hemant R Khalane, Ajay Naiknaware, Computational Sciences Experts Group*

Planned by Thermal Management Activity / EMB Land and Sea Group

Tuesday, April 4

New CI & SI Engines and Components (Part 1 of 2)

Session Code: ***PFL510***

Room 251 A ***Session Time:*** ***8:00 a.m.***

This session covers topics regarding new CI and SI engines and components. This includes analytical, experimental, and computational studies covering hardware development as well as design and analysis techniques.

Organizers - *Daniel K. Mather, Digital-Engines LLC; Jeffrey Naber, Michigan Technological Univ.; Leonid Tartakovsky, Technion Israel Inst. of Technology; Bryon Wasacz, Fiat Chrysler Automobiles*

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	**A Microwave Delivery System for Improved Flame Propagation in Internal Combustion Engines** *Terrence Alger, Barrett Mangold, Southwest Research Institute*
8:30 a.m.	2017-01-1021	**The New Toyota Inline 4-Cylinder 2.5L Gasoline Engine** *Masashi hakariya, Toyota Motor Co., Ltd.; Tadashi Toda, Mitsuto Sakai, Toyota Motor Corp.*
9:00 a.m.	2017-01-1022	**Development of New V6 3.5L Gasoline Direct Injection engine** *Kazuhiro Ogino, Yoshinori Yakabe, Keisuke Chujo, Nissan Motor Co., Ltd.*
9:30 a.m.	2017-01-1025	**A General Selection Method for the Compressor of the Hydrogen Internal Combustion Engine with Turbocharger** *Qinghe Luo, Baigang Sun, Xi Wang, Beijing Institute of Technology*
10:00 a.m.		**BREAK**
10:30 a.m.	2017-01-1026	**Understanding Limits to the Mechanical Efficiency of Opposed Piston Engines** *Richard Morton, Volvo Group Trucks Technology (retired); Romain Riviere, Stephen Geyer, Volvo Powertrain*
11:00 a.m.	2017-01-1029	**New 1.0L I3 Turbocharged Gasoline Direct Injection Engine** *Mitsuhiro Shibata, Masashi kawamata, Hirotaka Komatsu, Kazuki Maeyama, Masaru Asari, Naoki Hotta, Kazutaka Nakada, Hisashi Daicho, Honda R&D Co., Ltd.*

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

New CI & SI Engines and Components (Part 2 of 2)

Session Code: ***PFL510***

Room 251 A ***Session Time:*** ***1:30 p.m.***

This session covers topics regarding new CI and SI engines and components. This includes analytical, experimental, and computational studies covering hardware development as well as design and analysis techniques.

Organizers - *Daniel K. Mather, Digital-Engines LLC; Jeffrey Naber, Michigan Technological Univ.; Leonid Tartakovsky, Technion Israel Inst. of Technology; Bryon Wasacz, Fiat Chrysler Automobiles*

Time	Paper No.	Title
1:30 p.m.	2017-01-1027	**A Theoretical Investigation of the Combustion of PRF90 under the Flexible Cylinder Engine Mode** *Yang Wang, Lixia Wei, Guorui Jia, Mingfa Yao, Tianjin University*

2:00 p.m.	***2017-01-1030***	***Experimental Measurements and Computations for Clarifying Nearly Complete Air-Insulation Obtained by the Concept of Colliding Pulsed Supermulti-Jets*** *Remi Konagaya, Susumu Oyanagi, Takuto Kanase, Jumpei Tsuchiya, Ken Ayukawa, Kodai Kinoshita, Junya Mikoda, Hirotaka Fujita, Ken Naitoh, Waseda University*
2:30 p.m.	***2017-01-1031***	***Analysis of the Effect of Intake Plenum Design on the Scavenging Process in a 2-Stroke Boosted Uniflow Scavenged Direct Injection Gasoline (BUSDIG) Engine*** *Xinyan Wang, Jun Ma, Hua Zhao, Brunel University London*

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Automotive Gasoline Engine Lubricants

Session Code: ***PFL340***

Room 251 B ***Session Time:*** ***8:00 a.m.***

The industry continues to work on understanding the interaction of lubricating fluids with engine hardware in order to improve vehicle efficiency, durability, and performance. The Engine Lubricants Session presents a variety of papers dealing with advances in engine oils and their relationship to improved hardware performance.

Organizers - *Richard T. Butcher, BP Castrol*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0882***	***Engine Oil Fuel Economy Testing - A Tale of Two Tests*** *Alexander Michlberger, The Lubrizol Corporation; Peter Morgan, Southwest Research Institute; Ewan E. Delbridge, Matthew D. Gieselman, The Lubrizol Corporation; Michael Kocsis, Southwest Research Institute*
8:30 a.m.	***2017-01-0881***	***Development of Low Viscosity API SN 0W-16 Fuel-saving Engine Oil considering Chain Wear Performance*** *Takumaru Sagawa, Seiichi Nakano, Yohei Bito, Yusuke Koike, Sachiko Okuda, Rika Suzuki, Nissan Motor Co., Ltd.*
9:00 a.m.	***ORAL ONLY***	***Effects of VI Improver on Passenger Car Fuel Economy in Chassis Dynamometer Tests*** *Donald J. Smolenski, Evonik Oil Additives; Thorsten Bartels, Evonik Resource Efficiency Gmbh; Boris Eisenberg, Evonik Rohmax Additives Gmbh; Michael Seemann, Evonik Resource Efficiency Gmbh*
9:30 a.m.	***2017-01-0879***	***A Study of Ash Accumulation in the After-treatment System of a Gasoline Direct Injection Engine Equipped with a Gasoline Particulate Filter*** *Richard Bernardoff, Total R&D; Benjamin Hennebert, Thierry Delvigne, Olivier Courtois, DSi; Philippe China, Total R&D*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0877***	***Experimental Investigation on the Influence of Engine Oil Additives on Silicone Rubber*** *Shintaro Kusuhara, JXTG Nippon Oil and Energy Corporation; Kenichi Yoshimura, Kenichi Kunieda, Nozomu Suzuki, NOK Corporation; Shingo Matsuki, Yuji Shitara, JXTG Nippon Oil and Energy Corporation*

11:00 a.m.	***2017-01-0878***	***Combining DLC, Shot blasting, chemical dip and nano fullerene surface treatments to reduce wear and friction when used with bio-lubricants for automotive contacts.*** *Julia Carrell, Tom Slatter, University of Sheffield; Uel Little, South West College; Roger Lewis, University of Sheffield*
11:30 a.m.	***ORAL ONLY***	***Comparison of the impact of ionic liquid and ZDDP anti-wear lubricant additives on the reactivity of three-way catalysts*** *Dae-Kun Kim, University of Tennessee; Ke Nguyen, Univ of Tennessee; Daniel Brookshear, Todd Toops, Oak Ridge National Laboratory*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Basic SI Combustion and Emissions

Session Code: ***PFL211***

Room 251 B ***Session Time:*** ***1:30 p.m.***

This session focuses on basic SI combustion processes including studies of mixture formation, engine efficiency, flame propagation, and emissions formation. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation.

Organizers - *Richard S. Davis, General Motors LLC; Ronald James Herrin; Simona Silvia Merola, Istituto Motori CNR; John O. Waldman, General Motors LLC; Jennifer Wheeler, GM Powertrain*

Chairpersons - *Simona Merola, Istituto Motori CNR; Ronald Herrin*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0652***	***Impact of the Injection and Gas Exchange on the Particle Emission of a Spark Ignited Engine with Port Fuel Injection*** *Jose Claret, Thomas Lauer, Nikola Bobicic, Vienna University of Technology; Andreas Posselt, Joerg Schlerfer, Robert Bosch GmbH*
2:00 p.m.	***2017-01-0653***	***Study of in-cylinder soot formation and exhaust particle emissions in a small displacement spark ignition engine operating with ethanol mixed and dual fueled with gasoline*** *Francesco Catapano, Silvana Di Iorio, Ludovica Luise, Paolo Sementa, Bianca Maria Vaglieco, Istituto Motori CNR*
2:30 p.m.	***2017-01-0654***	***Effects of Multiple Parameters on Cyclic Variation of a SI Engine Fueled with 2-Methylfuran Gasoline Blends*** *Haiqiao Wei, Dengquan Feng, Mingzhang pan, JiaYing PAN, State Key Lab Of Engines, Tianjin University*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0655***	***Cyclically Resolved Flame and Flow Imaging in an SI Engine Operating with Future Ethanol Fuels*** *Mohammadmohsen Moslemin Koupaie, Alasdair Cairns, University of Nottingham; Hassan vafamehr, Thompson Lanzanova, Brunel University*
4:00 p.m.	***2017-01-0656***	***Application of High-Speed PIV Diagnostics for Simultaneous Investigation of Flow Field and Spark Ignited Flame inside an Optical SI Engine*** *Minh Khoi Le, Takashi Furui, Atsushi Nishiyama, Yuji Ikeda, Imagineering Inc.*

4:30 p.m.	***2017-01-0657***	***Influence of Injection Timing for Split-Injection Strategies on Well-Mixed High-Load Combustion Performance in an Optically Accessible Spark-Ignition Direct-Injection (SIDI) Engine*** *Lewis Gene Clark, Sanghoon Kook, Qing Nian Chan, Evatt R. Hawkes, The University of New South Wales*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Dual Fuel Combustion (Part 1 of 4)

Session Code: ***PFL260***

Room 251 C ***Session Time:*** ***9:00 a.m.***

Mixed mode using more than one fuel not fully mixed before combustion. Most often with auto ignition of spray injected late. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, and RCCI (Reactivity-Controlled Compression Ignition) are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL110 or PFL120 modeling sessions.

Organizers - *Scott Curran, Oak Ridge National Laboratory; Antonio Garcia, CMT Motores Termicos Universidad; Andrew Ickes, Argonne National Laboratory; Sage Kokjohn, Univ. of Wisconsin Madison; Benjamin Lawler, Stony Brook Univ.; Eric Jon Nafziger, Oak Ridge National Laboratory; William F. Northrop; Martin Wissink, Oak Ridge National Laboratory*

Time	***Paper No.***	***Title***
9:30 a.m.	***2017-01-0772***	***Cycle to Cycle Variation Study in a Dual Fuel Operated Engine*** *ShyamSundar Pasunurthi, Ravichandra Jupudi, GE, Global Research Center; Sameera Wijeyakulasuriya, Convergent Science Inc.; Sreenivasa Rao Gubba, GE, Global Research Center; Hong Im, Mohammed Jaasim Mubarak Ali, King Abdullah University of Science and Technology; Roy Primus, Adam Klingbeil, GE, Global Research Center; Charles Finney, Oak Ridge National Laboratory*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0756***	***Numerical Study on Controllability of Natural Gas and Diesel Dual Fuel Combustion in a Heavy-Duty Engine*** *Zhenkuo Wu, Hunan University; University of Wisconsin Madison; Christopher Rutland, University of Wisconsin Madison; Zhiyu Han, Hunan University*
11:00 a.m.	***2017-01-0760***	***A Numerical Study on the Effects of Hot EGR on the Operation of Natural Gas Engine Ignited by Diesel-Butanol Blends*** *Menghan Li, Shandong University; Xiangyu Meng, Dalian University of Technology; Jie HOU, Wuhan University of Technology; Suya Gao, University of Illinois; Chia-Fon Lee, University of Illinois; Beijing Institute of Technology; Guoxiang Li, Shandong University*
11:30 a.m.	***2017-01-0755***	***An Optical Investigation of Multiple Diesel Injections in CNG/Diesel Dual-Fuel Combustion in a Light Duty Optical Diesel Engine*** *Karthik Nithyanandan, Beijing Institute of Technology; University of Illinois; Yongli Gao, Han Wu, Beijing Institute of Technology; Chia-Fon Lee, Beijing Institute of Technology; University of Illinois; Fushui Liu, Beijing Institute of Technology; Junhao Yan, University of Illinois*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Dual Fuel Combustion (Part 2 of 4)

Session Code: ***PFL260***

Room 251 C ***Session Time:*** ***1:30 p.m.***

Mixed mode using more than one fuel not fully mixed before combustion. Most often with auto ignition of spray injected late. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, and RCCI (Reactivity-Controlled Compression Ignition) are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL110 or PFL120 modeling sessions.

Organizers - *Scott Curran, Oak Ridge National Laboratory; Antonio Garcia, CMT Motores Termicos Universidad; Andrew Ickes, Argonne National Laboratory; Sage Kokjohn, Univ. of Wisconsin Madison; Benjamin Lawler, Stony Brook Univ.; Eric Jon Nafziger, Oak Ridge National Laboratory; William F. Northrop; Martin Wissink, Oak Ridge National Laboratory*

Time	Paper No.	Title
1:30 p.m.	***2017-01-0766***	***Efficiency and Emissions Characteristics of Partially Premixed Dual-Fuel Combustion by Co-Direct Injection of NG and Diesel Fuel (DI²) - Part 2*** *Gary D. Neely, Radu Florea, Jason Miwa, Zainal Abidin, Southwest Research Institute*
2:00 p.m.	***2017-01-0774***	***Effect of Injection Strategies on Emissions from a Pilot-Ignited Direct-Injection Natural-Gas Engine- Part I: Late Post Injection*** *Ehsan Faghani, Pooyan Kheirkhah, Christopher W.J. Mabson, University of British Columbia; Gordon McTaggart-Cowan, Westport Fuel Systems; Patrick Kirchen, Steve Rogak, University of British Columbia*
2:30 p.m.	***2017-01-0763***	***Effect of Injection Strategies on Emissions from a Pilot-Ignited Direct-Injection Natural-Gas Engine- Part II: Slightly Premixed Combustion*** *Ehsan Faghani, Pooyan Kheirkhah, Christopher W.J. Mabson, University of British Columbia; Gordon McTaggart-Cowan, Westport Fuel Systems; Patrick Kirchen, Steve Rogak, University of British Columbia*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0764***	***Parametric Analysis of Compression Ratio Variation Effects on Thermodynamic, Gaseous Pollutant and Particle Emissions of a Dual-Fuel CH₄-Diesel Light Duty Engine*** *Gabriele Di Blasio, Giacomo Belgiorno, Carlo Beatrice, Istituto Motori CNR*
4:00 p.m.	***2017-01-0769***	***Application of a Dual Fuel Diesel-CNG Configuration in a Euro 5 Automotive Diesel Engine*** *Pierpaolo Napolitano, Chiara Guido, Carlo Beatrice, Nicola Del Giacomo, Istituto Motori CNR*
4:30 p.m.	***2017-01-0759***	***Dual-fuel combustion characterization on lean conditions and high loads*** *Rasmus Pettinen, Ossi Kaario, Martti Larmi, Aalto University*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Fuel Injection and Sprays (Part 1 of 8)

Session Code: ***PFL320***

Room 252 A ***Session Time:*** ***8:00 a.m.***

This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of both gasoline and diesel fuel sprays and fuel injection equipment are encouraged.

Organizers - *Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Shyam Menon, Louisiana State University; Michele Battistoni, Universita degli Studi di Perugia; Julien Manin, Sandia National Laboratories*

Chairpersons - *Robert Campion, Caterpillar Tech Center; Kaushik Saha, Argonne National Laboratory*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0850***	***An experimental study on Diesel spray injection into a non-quiescent chamber*** *Jose Pastor, Jose M Garcia-Oliver, Antonio Garcia, Universitat Politecnica de Valencia; Wenjun Zhong, Jiangsu University; Carlos MicÃ³, Integrale Marketing and Consulting SLU; Tiemin Xuan, Universitat Politecnica de Valencia*
8:30 a.m.	***2017-01-0815***	***Transient Flame Development in a Constant-Volume Vessel Using a Split-Scheme Injection Strategy*** *Noud Maes, P.C. Bakker, Nico Dam, Bart Somers, Eindhoven University Of Technology*
9:00 a.m.	***2017-01-0846***	***Nozzle Geometry Size Influence on Reactive Spray Development: From Spray B to Heavy Duty Applications*** *Raul Payri, Gabriela Bracho, Pedro Marti-Aldaravi, Alberto Viera, Universitat Politecnica de Valencia*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0821***	***Diesel Spray Characterization at Ultra-High Injection Pressure of DENSO 250 MPa Common Rail Fuel Injection System*** *Qinglin Xu, Min Xu, Shanghai Jiao Tong University; David Hung, UM-SJTU JI - Shanghai Jiao Tong University; Shengqi Wu, Xue Dong, Shanghai Jiao Tong University; Hiroaki Ochiai, Zhisong Zhao, Caixia Wang, Kaiyue Jin, DENSO (China) Investment Co., Ltd.*
11:00 a.m.	***2017-01-0832***	***Kilohertz Mie Scattering and OH* Chemiluminescence Imaging of JP-8 Multiple Injections Using a 250 MPa Fuel Injector*** *Jacob Temme, US Army Research Laboratory; Vincent Coburn, Engility; Chol-Bum Kweon, US Army Research Laboratory*
11:30 a.m.	***ORAL ONLY***	***Experimental Investigation of Injection Pressure Effect on Spray and Combustion of Dimethyl Ether (DME) in a Pressurized Combustion Vessel*** *Xiucheng Zhu, Michigan Technological Univ; Khanh Cung, Argonne National Laboratory; Ahmed Abdul Moiz, Seong-Young Lee, Michigan Technological Univ*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Fuel Injection and Sprays (Part 2 of 8)

Session Code: ***PFL320***

Room 252 A ***Session Time:*** ***1:30 p.m.***

This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of both gasoline and diesel fuel sprays and fuel injection equipment are encouraged.

Organizers - *Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National*

Laboratory; Shyam Menon, Louisiana State University; Michele Battistoni, Universita degli Studi di Perugia; Julien Manin, Sandia National Laboratories

Chairpersons - *Essam El-Hannouny, Muhsin Ameen, Argonne National Laboratory*

Time	Paper No.	Title
1:30 p.m.	***2017-01-0857***	***High pressure Ethanol injection under Diesel-like conditions*** *Michael Saccullo, Mats Andersson, Chalmers University of Technology; Jan Eismark, Volvo; Ingemar Denbratt, Chalmers University of Technology*
2:00 p.m.	***2017-01-0820***	***Experimental Investigation of Superheated Fuel Spray Characteristics for D.I.S.I Engines*** *Eriko Matsumura, Jiro Senda, Keitaro Imori, Yudai Sakai, Doshisha University*
2:30 p.m.	***2017-01-0831***	***Characteristics and Cyclic Variation of Spray under the Influence of Swirl Ratio and Flash Boiling in SIDI Engine*** *Jie Yang, Shanghai Jiao Tong University; Xue Dong, University College*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0855***	***Influence of Engine-like Conditions on Macroscopic as well as Microscopic Spray Behavior of GDI injector using Isooctane and Alcohols*** *Rakesh Kale, R. Banerjee, Indian Institute of Technology Hyderabad*
4:00 p.m.	***2017-01-0839***	***Chaos Theory Approach as Advanced Technique for GDI Spray Analysis*** *Luigi Allocca, Alessandro Montanaro, Istituto Motori CNR; Amedeo Amoresano, Giuseppe Langella, Vincenzo Niola, Giuseppe Quaremba, UniversitÃ Federico II*
4:30 p.m.	***2017-01-0858***	***Optical Methodology for Characterization of a Gasoline Direct Injection Closing Event Droplet Distribution*** *Robert A. Schroeter, Michigan Technology; Ford Motor Company; Mark Meinhart, Ford Motor Company*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Combustion in Compression-Ignition Engines: In-Cylinder Processes (Part 1 of 2)

Session Code: ***PFL222***

Room 252 B ***Session Time:*** ***8:30 a.m.***

Papers focusing on in-cylinder processes of classical diesel engine combustion with relatively short ignition delay, including papers dealing with low compression ratio and high exhaust-gas recirculation calibrations. Subject matter may include both simulation results and experimental work, including applications of optical diagnostics, with emphasis on in-cylinder spray, evaporation, mixing, pollutant formation/destruction, or any other in-cylinder phenomena.

Organizers - *Raul Payri, Jose M Garcia-Oliver, Universitat Politecnica de Valencia; Dale R. Tree, Brigham Young Univ.; Song-Charng Kong, Iowa State Univ.; Yongli Qi, Caterpillar Inc.; John F. Wright, Cummins Inc.; Ming Zheng, Univ. of Windsor; Mark P. B. Musculus, Sandia National Laboratories; Robert M. McDavid, Caterpillar Inc.*

Chairpersons - *Michele Bardi, IFP Energies Nouvelles; Vicent Domenech, General Motors Global R & D*

Time	Paper No.	Title

8:30 a.m.	***2017-01-0691***	***Study of Low Soot or Soot-Free Leaner Lifted Flame Combustion in a Light Duty Optical Engine*** *Louis-Marie Malbec, Julian Kashdan, IFP Energies nouvelles; Institut Carnot IFPEN TE*
9:00 a.m.	***2017-01-0693***	***Influence of the Injector Geometry at 250 MPa Injection in a Light-Duty Diesel Engine*** *Seungwoo Kang, Wonkyu Cho, Choongsik Bae, Korea Advanced Institute of Science and Technology; Youngho Kim, Hyundai Motor Company*
9:30 a.m.	***2017-01-0704***	***Theoretical Study on Spray Design for Small-Bore Diesel Engine (Second Report)*** *Noriyuki Takada, Takeshi Hashizume, Terutoshi Tomoda, Toyota Motor Corporation; Kazuhisa Inagaki, Kiyomi Kawamura, Toyota Central R&D Labs Inc.*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0711***	***Laser-Induced Incandescence Measurements of Tailor-Made Fuels in an Optical Single-Cylinder Diesel Engine*** *Daniel Klein, Stefan Pischinger, RWTH Aachen University*
11:00 a.m.	***2017-01-0714***	***Simultaneous Measurement of Natural Flame Luminosity and Emission Spectra in a RCCI Engine under Different Fuel Stratification Degrees*** *Qinglong Tang, Haifeng Liu, Mingfa Yao, Tianjin University*
11:30 a.m.	***2017-01-0722***	***A Combination of Swirl Ratio and Injection Strategy to Increase Engine Efficiency*** *Pablo Olmeda, Jaime Martin, Antonio Garcia, David Villalta, Universitat Politecnica de Valencia; Alok Warey, Vicent Domenech, General Motors Global R & D*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Combustion in Compression-Ignition Engines: In-Cylinder Processes (Part 2 of 2)

Session Code: ***PFL222***

Room 252 B ***Session Time:*** ***1:30 p.m.***

Papers focusing on in-cylinder processes of classical diesel engine combustion with relatively short ignition delay, including papers dealing with low compression ratio and high exhaust-gas recirculation calibrations. Subject matter may include both simulation results and experimental work, including applications of optical diagnostics, with emphasis on in-cylinder spray, evaporation, mixing, pollutant formation/destruction, or any other in-cylinder phenomena.

Organizers - *Raul Payri, Jose M Garcia-Oliver, Universitat Politecnica de Valencia; Dale R. Tree, Brigham Young Univ.; Song-Charng Kong, Iowa State Univ.; Yongli Qi, Caterpillar Inc.; John F. Wright, Cummins Inc.; Ming Zheng, Univ. of Windsor; Mark P. B. Musculus, Sandia National Laboratories; Robert M. McDavid, Caterpillar Inc.*

Chairpersons - *Andres Tiseira, Universitat Politecnica de Valencia; Kan Zha, Sandia National Laboratories*

Time	***Paper No.***	***Title***
2:00 p.m.	***2017-01-0707***	***Effects of Microwave Enhanced Plasma on Diesel Spray Combustion*** *Srinivas Padala, Minh Khoi Le, Yoshihiro Wachi, Yuji Ikeda, Imagineering,Inc.*
3:00 p.m.		***BREAK***

3:30 p.m.	***2017-01-0716***	***Guidelines for Interpreting Soot Luminosity Imaging*** *Randy Hessel, Zongyu Yue, Rolf Reitz, University of Wisconsin Madison; Mark Musculus, Sandia National Laboratories; Jacqueline O'Connor, Pennsylvania State University*
4:00 p.m.	***2017-01-0717***	***Assessment of Different Included Spray Cone Angles and Injection Strategies for PCCI Diesel Engine Combustion*** *Metin Korkmaz, Rene Zweigel, Kai Niemietz, Bernhard Jochim, Dirk Abel, Heinz Pitsch, RWTH Aachen University*
4:30 p.m.	***2017-01-0710***	***A Comparison between In-Flame and Exhaust Soot Nanostructures in a Light-Duty Diesel Engine*** *Yilong Zhang, Renlin Zhang, Lingzhe Rao, Sanghoon Kook, The University of New South Wales*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Multi-Dimensional Engine Modeling (Part 1 of 6)

Session Code: ***PFL120***

Room 258 ***Session Time:*** ***8:00 a.m.***

The session covers advances in the development and application of models and tools involved in multi-dimensional engine modeling: advances in chemical kinetics, combustion and spray modeling, turbulence, heat transfer, mesh generation, and approaches targeting improved computational efficiency. Papers employing multi-dimensional modeling to gain a deeper understanding of processes related to turbulent transport, transient phenomena, and chemically reacting, two-phase flows are also encouraged.

Organizers - *Hardo Barths, General Motors; Gianluca D'Errico, Politecnico di Milano; Stefano Fontanesi, Universita degli Studi di Modena; Daniel C. Haworth, Penn State Univ-University Park*

Chairpersons - *Yuri M. Wright, ETH Zurich*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0573***	***Computational Study of Stratified Combustion in an Optical Diesel Engine*** *Mohammed Jaasim Mubarak ali, Francisco Hernandez Perez, R Vallinayagam, S Vedharaj, Bengt Johansson, Hong Im, King Abdullah University of Science & Technology*
8:30 a.m.	***2017-01-0564***	***Implementation of a Tabulated Flamelet Model for Compression Ignition Engine Applications*** *Prithwish Kundu, Muhsin Ameen, Umesh Unnikrishnan, Sibendu Som, Argonne National Laboratory*
9:00 a.m.	***2017-01-0571***	***Modeling n-dodecane Spray Combustion with a Representative Interactive Linear Eddy Model*** *Tim Lackmann, Chalmers University of Technology; Tommaso Lucchini, Gianluca D'Errico, Politecnico di Milano; Alan Kerstein, Consultant; Michael Oevermann, Chalmers University of Technology*
9:30 a.m.	***2017-01-0580***	***Dilute Combustion Assessment in Large Bore, Low Speed Engines*** *Zainal Abidin, Kevin Hoag, Nicholas Badain, Southwest Research Institute*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0574***	***CFD Modelling of the Effects of Exhaust Gas Recirculation (EGR) and Injection Timing on Diesel Combustion and Emissions*** *Ishan Verma, Ellen Meeks, Eric Bish, Martin Kuntz, Karthik Puduppakkam, Long Liang, Chitralkumar Naik, ANSYS Inc.*

11:00 a.m.	***2017-01-0558***	***Numerical Analysis of the Steady-State Scavenging Flow Characteristics of a Two-Stroke Marine Engine*** *Lei Cui, Tianyou Wang, Kai Sun, Zhen Lu, Zhizhao Che, Yanzhe Sun, Tianjin University*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00578, and also individually. T purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Multi-Dimensional Engine Modeling (Part 2 of 6)

Session Code: ***PFL120***

Room 258 ***Session Time:*** ***1:30 p.m.***

The session covers advances in the development and application of models and tools involved in multi-dimensional engine modeling: advances in chemical kinetics, combustion and spray modeling, turbulence, heat transfer, mesh generation, and approaches targeting improved computational efficiency. Papers employing multi-dimensional modeling to gain a deeper understanding of processes related to turbulent transport, transient phenomena, and chemically reacting, two-phase flows are also encouraged.

Organizers - *Hardo Barths, General Motors; Gianluca D'Errico, Politecnico di Milano; Stefano Fontanesi, Universita degli Studi di Modena; Daniel C. Haworth, Penn State Univ-University Park*

Chairpersons - *Kyoungdoug Min, Seoul National Univ.*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0554***	***Evaluation of Kinetics Process in CFD Model and Its Application in Ignition Process Analysis of a Natural Gas-Diesel Dual Fuel Engine*** *Yu Li, West Virginia University; Hongsheng Guo, National Research Council Canada; Hailin Li, West Virginia University*
2:00 p.m.	***2017-01-0556***	***Modeling Non-Premixed Combustion Using Tabulated Kinetics and Different Fame Structure Assumptions*** *Tommaso Lucchini, Gianluca D'Errico, Angelo Onorati, Alessio Frassoldati, Alessandro Stagni, Politecnico di Milano; Gilles Hardy, FPT Motorenforschung AG*
2:30 p.m.	***2017-01-0560***	***Effect of Start of Injection on the Combustion Characteristics in a Heavy-Duty DICI Engine Running on Methanol*** *Mateusz Pucilowski, Mehdi Jangi, Sam Shamun, Changle Li, Martin Tuner, Xue-Song Bai, Lund University*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0568***	***Multidimensional Simulations of Combustion in Methane-Diesel Dual-Fuel Light-Duty Engines*** *Valentina Fraioli, Carlo Beatrice, Gabriele Di Blasio, Istituto Motori CNR; Giacomo Belgiorno, University of Naples Parthenope; Marianna Migliaccio, Istituto Motori CNR*
4:00 p.m.	***2017-01-0582***	***Numerical Modeling of International Variations in Diesel Spray Combustion with Evaporation Surrogate and Virtual Species Conversion*** *Naoki Kurimoto, Naoki Watanabe, Shinya Hoshi, Satoru Sasaki, DENSO Corporation; Masashi Matsumoto, Japan Automobile Research Institute*

4:30 p.m.	***2017-01-0566***	***Physics of Combustion Noise Reduction with Multiple Injections in a DI Diesel Engine - A Computational Study*** *Ramachandra Diwakar, Vicent Domenech-Llopis, General Motors Global R & D*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00578, and also individually. T purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Abnormal SI Combustion (Preignition & SPI / LSPI)

Session Code: ***PFL217***

Room 259 ***Session Time:*** ***8:00 a.m.***

This session addresses abnormal SI combustion processes with a focus on preignition, including low-speed, stochastic preignition on boosted engines. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation.

Organizers - *Vincent S. Costanzo, Aramco Research Center; Richard S. Davis, General Motors LLC; Andrew B. Mansfield, General Motors*

Chairpersons - *Richard Davis, General Motors LLC; Vincent Costanzo, Aramco Research Center; Andrew Mansfield, General Motors*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0685***	***The Impact of Lubricant Volatility, Viscosity and Detergent Chemistry on Low Speed Pre-Ignition Behavior*** *Michael Clifford Kocsis, Thomas Briggs, Garrett Anderson, Southwest Research Institute*
8:30 a.m.	***2017-01-0688***	***Engine Operating Conditions and Fuel Properties on Pre-Spark Heat Release and SPI Promotion in SI Engines*** *Derek Splitter, Brian Kaul, James Szybist, Gurneesh Jatana, Oak Ridge National Laboratory*
9:00 a.m.	***2017-01-0686***	***Effect of Timing and Location of Hotspot on Super Knock during Pre-ignition*** *Mohammed Jaasim Mubarak Ali, Francisco Hernandez Perez, S. Vedharaj, R. Vallinayagam, Robert Dibble, Hong Im, King Abdullah University of Science and Technology*
9:30 a.m.	***2017-01-0689***	***On Knock Intensity and Superknock in SI Engines*** *Gautam Kalghatgi, Ibrahim Algunaibet, Kai Morganti, Saudi Aramco*
10:30 a.m.	***2017-01-0690***	***Investigation into Occurrence of Megaknock and Auto-Ignition in GTDI Engines*** *Maziar Khosravi, Helmut Ruhland, Thomas Lorenz, Carsten Weber, Ford Motor Company*
11:00 a.m.	***ORAL ONLY***	***Effect of market variations in gasoline composition on aspects of stochastic pre-ignition*** *Andrew B. Mansfield, General Motors*
11:30 a.m.	***2017-01-0687***	***Influence of Ethanol Blends on Low Speed Pre-Ignition in Turbocharged, Direct-Injection Gasoline Engines*** *Patrick Haenel, Henning Kleeberg, Rob de Bruijn, Dean Tomazic, FEV North America Inc.*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Technical Expert Panel Discussion - Low Temperature Combustion â€' Collaboration within the IEA Task for Energy Conservation and Emissions Reduction

Session Code: ***PFL200***

Room 259 ***Session Time:*** ***1:30 p.m.***

The purpose of the IEA Implementing Agreement on Energy Conservation and Emissions Reduction in Combustion program is to improve fundamental and applied combustion technology which is developed to provide predictive design capabilities for internal combustion engines, furnaces, and gas turbines. The collaborative task within this agreement on Low Temperature Combustion (LTC) seeks to investigate the potential of low-temperature combustion strategies to reduce petroleum consumption, either through improved engine efficiency or through use of non-conventional, low carbon intensity fuels. An international panel of IEA LTC task collaborators and other stakeholders from the field will discuss how LTC can help reach future targets of energy efficiency, energy security, reduction of GHG as well as other emissions from road transport. Topics will include: Implications with respect to after-treatment/controls with multi-mode LTC stratagies; What research is needed still needed to promote commercialization; Opportunities and challenges for LTC strategies to meet new emissions standards, and other topics.

Organizers - *Ã¡ivind Andersson, Lund University; Scott Curran, Oak Ridge National Laboratory; Magnus SjÃ¶berg, Sandia National Laboratories*

Panelists - *Choongsik Bae, Korea Advanced Inst. of Science & Tech.; Stephen Ciatti, Argonne National Laboratory; Scott Curran, Oak Ridge National Laboratory; Magnus SjÃ¶berg, Sandia National Laboratories; Per Tunestal, Lund University;*

Tuesday, April 4

Advanced Hybrid and Electric Vehicle Powertrains (Part 1 of 6)

Session Code: ***PFL710***

Room 260 Portside Ballroom ***Session Time:*** ***8:30 a.m.***

This session covers new production and near-production hybrid powertrains, hybrid architecture, and testing.

Organizers - *Michael Duoba, Argonne National Laboratory; Matthew Fleming, Ford Motor Co., Ltd.; Andrej Ivanco, Clemson-ICAR; Wiley R. McCoy, McLaren Performance Technologies; Constantine N. Raptis, GM Powertrain*

Time	Paper No.	Title
8:30 a.m.	***ORAL ONLY***	***Range-Extender Electric Vehicle Powertrain for an Printed Utility Vehicle*** *Scott Curran, Paul Chambon, Oak Ridge National Laboratory*
9:00 a.m.	***2017-01-1167***	***Reduction of Cranking Noise from High Voltage Starter for One-Motor Two-Clutch Hybrid Systems*** *Kousuke Baba, Yuuki Kubo, Toyoji Yagi, Akihiro Imura, DENSO Corporation*
9:30 a.m.	***2017-01-1157***	***Rattling Noise Reduction Technology for Multi Stage Hybrid Transmission*** *Hiroyuki Tateno, Yuji Yasuda, Masatoshi Adachi, Haruhisa Suzuki, Tomoaki Furukawa, Koji Hayashi, Shohei Nagata, TOYOTA MOTOR CORPORATION*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1147***	***Impact of Speed Reduction (Multiplication) Gear on the Performance of Input- and Output-Split Hybrid Electric Vehicles*** *Hyunjun Kim, Jingeon Kang, Dongsuk Kum, Korea Advanced Institute of Science & Technology*
11:00 a.m.	***2017-01-1148***	***Compound Lever Based Optimal Configuration Selection of Compound-Split Hybrid Vehicles*** *Toumadher Barhoumi, Hyunjun Kim, Dongsuk Kum, KAIST*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Advanced Hybrid and Electric Vehicle Powertrains (Part 2 of 6)

Session Code: ***PFL710***

Room 260 Portside Ballroom ***Session Time:*** ***1:30 p.m.***

This session covers new production and near-production hybrid powertrains, hybrid architecture, and testing.

Organizers - *Michael Duoba, Argonne National Laboratory; Matthew Fleming, Ford Motor Co., Ltd.; Andrej Ivanco, Clemson-ICAR; Wiley R. McCoy, McLaren Performance Technologies; Constantine N. Raptis, GM Powertrain*

Time	Paper No.	Title
1:30 p.m.	2017-01-1153	**Analysis and Control of a Torque Blended Hybrid Electric Powertrain with a Multi-Mode LTC-SI Engine** *Ali Solouk, Michigan Technological University; Mohammad Shakiba-herfeh, Ford Motor Company; Mahdi Shahbakhti, Michigan Technological University*
2:00 p.m.	2017-01-1160	**Energy Management Analysis under Different Operating Modes for a Euro-6 Plug-in Hybrid Passenger Car** *Claudio Cubito, Luciano Rolando, Federico Millo, Politecnico di Torino, Italy; Biagio Ciuffo, Simone Serra, Germana Trentadue, Marcos Garcia Otura, Georgios Fontaras, Joint Research Centre*
2:30 p.m.	2017-01-1159	**Economy Mode for Electrified Vehicles** *William D. Treharne, Charles Badger, Douglas Martin, Mohamed Mansour, Mark Smith, Ford Motor Company*
3:00 p.m.		**BREAK**
3:30 p.m.	2017-01-1154	**Powersplit or Parallel - Selecting the Right Hybrid Architecture** *Jimmy Kapadia, Daniel Kok, Mark Jennings, Ming Kuang, Brandon Masterson, Richard Isaacs, Alan Dona, Chuck Wagner, Thomas Gee, Ford Motor Company*
4:00 p.m.	2017-01-1162	**A Study of Greenhouse Gas Emissions Reduction Opportunity in Light-Duty Vehicles by Analyzing Real Driving Patterns** *Ken Laberteaux, Karim Hamza, Toyota Motor Corporation*
4:30 p.m.	2017-01-1152	**Control Analysis and Model Validation for BMW i3 Range Extender** *Jongryeol Jeong, Argonne National Laboratory; Wonbin Lee, Sungkyunkwan University; Namdoo Kim, Kevin Stutenberg, Aymeric Rousseau, Argonne National Laboratory*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Fatigue Modeling / Testing & CAE Durability Analysis (Part 1 of 6)

Session Code: ***M200***

Room 310 B ***Session Time:*** ***8:00 a.m.***

Topics discussed in this session focus on innovative and improved fatigue methodologies and problem-solving techniques on automotive components, assemblies, and vehicles based on material characterization, testing and CAE (Computer Aided Engineering) analysis.

Organizers - *Abolhassan Khosrovaneh, General Motors LLC; Guofei Chen, United States Steel Corp.; Carlos Carvalho Engler-Pinto, Ford Motor Co., Ltd.; Mingchao Guo, FCA US LLC; Zhigang Wei, Tenneco Inc.*

Chairpersons - *Abolhassan Khosrovaneh, General Motors LLC*

Time	Paper No.	Title

8:00 a.m.	***ORAL ONLY***	***Technical Keynote: Fatigue Life Estimation of Notched and Welded Structures Based on the Material Elastic-Plastic Stressâ€“Strain Response at the Crack Tip***
		Grzegorz Glinka, Univ. of Waterloo; S. Mikheevskiy, S. Bogdanov, University of Waterloo; Rakesh Goyal, Deere & Company
9:00 a.m.	***2017-01-0329***	***A Computational Multiaxial Model for Stress-Strain Analysis of Ground Vehicle Notched Components***
		Ayhan Ince, Purdue University
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0331***	***Experimental Study of Mixed Mode Fatigue Crack Growth of Automotive Structural Adhesive BM4601***
		Qiuren Chen, Haiding Guo, Nanjing University of Aeronautics and Astronautics; Katherine Avery, Xuming Su, Ford Motor Company; HongTae Kang, University of Michigan
10:30 a.m.	***2017-01-0333***	***Improving the Accuracy of Dynamic Vibration Fatigue Simulation***
		Kurt Munson, Frederic Kihm, Andrew Halfpenny, HBM Prenscia
11:00 a.m.	***ORAL ONLY***	***FEA based Multiaxial Fatigue life simulation of Tractor Rear Shaft Assy using time series channel history acquired during field application and Establish correlation with Accelerated fatigue testing.Further Cumulative Damage calculation done using duty cycles of various service Load-cases"***
		Pawan Singh, Tafe Motors and Tractors Limited

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 4

Fatigue Modeling / Testing & CAE Durability Analysis (Part 2 of 6)

Session Code: ***M200***

Room 310 B ***Session Time:*** ***1:00 p.m.***

Topics discussed in this session focus on innovative and improved fatigue methodologies and problem-solving techniques on automotive components, assemblies, and vehicles based on material characterization, testing and CAE (Computer Aided Engineering) analysis.

Organizers - *Abolhassan Khosrovaneh, General Motors LLC; Guofei Chen, United States Steel Corp.; Carlos Carvalho Engler-Pinto, Ford Motor Co., Ltd.; Mingchao Guo, FCA US LLC; Zhigang Wei, Tenneco Inc.*

Chairpersons - *Mingchao Guo, FCA US LLC*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-0337***	***Effect of Engine Motion on the Fatigue Life of Cooling Components***
		Kalyan S. Nadella, Yi Zhang, Ford Motor Company
1:30 p.m.	***2017-01-0338***	***Application of Weld Fatigue Evaluation Procedure for Considering Multi-Axial Stress States Using the Battelle Structural Stress Method***
		Jeong Kyun Hong, Andrew Cox, Battelle
2:00 p.m.	***2017-01-0339***	***Simultaneous Durability Assessment and Relative Random Analysis Under Base Shake Loading Conditions***
		Sandip Datta, FCA US LLC; Neil Bishop, CAEfatigue, Ltd.; Karl Sweitzer, Booz Allen Hamilton Inc; Alexander Atkins, Teide Soluciones SL
2:30 p.m.		***BREAK***

3:00 p.m.	***2017-01-0340***	***Fatigue Life Prediction of Injection Molding Tool*** *Li Lu, Jane Zhou, Ford Motor Company; Ram Iyer, ArcelorMittal; Jeffrey Webb, Derren Woods, Thomas Pietila, Ford Motor Company*
3:30 p.m.	***2017-01-0341***	***A Finite Element Method for Camshaft Cap Durability Analysis*** *Seyyedvahid Mortazavian, Javid Moraveji, Reda Adimi, Xingfu Chen, Ford Motor Company*
4:00 p.m.	***2017-01-0344***	***Fatigue Assessment of Nodular Cast Iron with Material Imperfections*** *Christoph Bleicher, Rainer wagener, Heinz Kaufmann, Tobias Melz, Fraunhofer Institute LBF*
4:30 p.m.	***2017-01-0342***	***Cyclic Material Behavior of High-Strength Steels Used in the Fatigue Assessment of Welded Crane Structures with a Special Focus on Transient Material Effects*** *Benjamin MÃ¶ller, Alessio Tomasella, Rainer Wagener, Tobias Melz, Fraunhofer LBF*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 4

Automotive Engineering Testing and Test MethodsÂ (Part 1 of 2)

Session Code: ***M203***

Room 311 A ***Session Time:*** ***8:00 a.m.***

The focus of this session are the tests and test methods employed in the evaluation of the performance and durability of powertrain (engines, transmissions), driveline (4WD systems, driveshafts, axles), chassis (frame, suspensions, brakes, etc.) and body components, subsystems, and full vehicle systems.

Organizers - *Darryl S. Taylor, Boeing; Michael Temkin, Liang Wang, FCA US LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0391***	***Calibration Considerations for Six Sigmaâ„¢ Accuracy and Precision in Combustion Pressure Measurement*** *Daniel Meyer, Peter Maehling, Thomson Varghese, Jeffery Lewis, AVL Test Systems, Inc.*
8:30 a.m.	***2017-01-0386***	***Modular Fault Diagnosis System for Engine Test Bed Measurements*** *Michael Wohlthan, Gerhard Pirker, LEC GmbH; Andreas Wimmer, Graz University of Technology*
9:00 a.m.	***2017-01-0382***	***Open Source Dynamometer with Closed-Loop Control*** *Oscar Hernandez Cervantes, Antonio Espiritu Santo Rincon, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0388***	***A Development of Energy Management System with Semi-Transparent Solar Roof and Off-Cycle Credit Test Methodology for Solar Power Assisted Automobile.*** *Haeyoon Jung, MiYeon Song, Sanghak Kim, Hyundai Motor Company*
10:30 a.m.	***2017-01-0390***	***Evaluation and Prevention of Corrosion Risks for Light Weight Automotive Exhaust Components*** *Muhamamd Yasir, Helmut Wieser, Daniel Knoll, Simon Burger, Faurecia Emissions Control Technologies*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 4

Automotive Engineering Testing and Test MethodsÂ (Part 2 of 2)

Session Code: ***M203***

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Organizers - *Darryl S. Taylor, Boeing; Michael Temkin, Liang Wang, FCA US LLC*

Time	Paper No.	Title
1:00 p.m.	***2017-01-0380***	***Considerations of Vibration Fatigue for Automotive Components*** *Liang Wang, Robert Burger, Alan Aloe, FCA US LLC*
1:30 p.m.	***2017-01-0393***	***The Root Cause Analysis of Steel Fuel Tank Cracking at a Fatigue Point and Test Method Development of Durability*** *Keunsoo Kim, Hyundai Motor Co.*
2:00 p.m.	***2017-01-0389***	***Accelerated Testing of Brake Hoses for Durability Assessment*** *Carlo Cantoni, Brembo Engineering Spa; Giampiero Mastinu, Massimiliano Gobbi, Federico Ballo, Giorgio Previati, Politecnico di Milano*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0384***	***Component Tests Based on Vehicle Modeling and Virtual Testing*** *Bo Zhang, Qingzhu Cai, Yong Lu, Jianfeng Wang, Lei Wang, Wenqian Chen, Lie Yao, Yuqing Gu, Tao Gu, SAIC; Shawn S. You, MTS Systems Corp.*
3:30 p.m.	***2017-01-0392***	***Degradation of Vehicle Noise and Vibration by Ageing of Elastomers*** *Dae-Un Sung, Hyundai-Kia Motors; James Busfield, Queen Mary University of London; Yong Hyun Ryu, Hyundai-Kia Motors*
4:00 p.m.	***2017-01-0381***	***Data Acquisition and Failure Simulation of Metal Bumper for Heavy Commercial Vehicle*** *L. Karthik, R. Dinesh Kumar, E. Prasanna Kumar, V. Srinivasa Chandra, Ashok Leyland Ltd.*
4:30 p.m.	***2017-01-0387***	***Remnant Life Estimation of Automotive Components by Resonance Fatigue Method*** *Deepak Anand Subramanian, Ashok Leyland, Ltd.; Shanmugam Mathaiya, V Srinivasa Chandra, Ashok Leyland Technical Center*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 4

Key Success Factors for DFSS, Lean Product Development, and Manufacturing

Session Code: ***IDM400***

Room 311 B ***Session Time:*** ***8:00 a.m.***

This technical session deals with research and development efforts addressing the advancement and applications of Lean methodologies and Quality improvement in the mobility industry. Presentations in this session will portray the latest developments in the principles, practices, tools, processes, and applications of Lean and Quality improvement methodologies.

Organizers - *Mohan Paruchuri, Hutchinson FMS; Zissimos Mourelatos, Oakland Univ.*

Chairpersons - *Mohan Paruchuri, Hutchinson FMS; Atul Kalia, CERTUS Management Consultants, LLC*

Time	Paper No.	Title

8:00 a.m.	***2017-01-0298***	***Failure Mode Avoidance Approach for Hybrid Electric Vehicle Systems*** *Allen Dobryden, Ford Motor Company, Retired; Brian Rutter, Derek Hartl, Eric Bramson, Ford Motor Company*
8:30 a.m.	***2017-01-0295***	***Supplier Quality Engineering and Lean Manufacturing Integration*** *Silvio CÃsar Bastos, MWM Navistar Company*
9:00 a.m.	***ORAL ONLY***	***The Rapid Learning Cycles Framework to Drive Lean Product Development*** *Katherine Radeka, Rapid Learning Cycles Institute; Mohan Paruchuri, Hutchinson, FMS*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0296***	***Process Mapping for Forward Models Quality*** *Oberti Dos Santos Almeida, Ford Motor Company*
10:30 a.m.	***2017-01-0299***	***Artifact Based Assessment of CNC Machine Thermal Growth and Compensation*** *Chandra Jalluri, Himanshu Rajoria, Mark Goderis, Michael Habel, Trevor Hill, Ford Motor Company*
11:00 a.m.	***ORAL ONLY***	***A Scrum Approach Used to Accomplish the Test and Verification Objectives Within the Context of a Stage Gate Project*** *Jon M. Quigley*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Tuesday, April 4

Multidisciplinary Design Optimization (MDO)

Session Code: ***IDM111***

Room 311 B ***Session Time:*** ***1:00 p.m.***

Multidisciplinary design optimization (MDO) focuses on optimizing the performances of complex systems that involve multiple interacting disciplines. It may encompasses design synthesis, sensitivity analysis, approximation concepts, optimization methods and strategies, artificial intelligence, and rule-based design - all in the context of integrated design dealing with multiple disciplines and interacting subsystems or systems of systems.

Organizers - *Ching-Hung Chuang, Ford Motor Company; Simon Xu, General Motors LLC; Ren-Jye Yang, Ford Motor Company*

Chairpersons - *James Cheng, Ford Research and Innovation Center*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-0254***	***Use of parametric approach to optimize structural adhesives and spot welds in CAE based optimization*** *Sudeep Chavare, Kevin Thomson, Nitin Sharma, FCA US LLC*
1:30 p.m.	***2017-01-0250***	***Multi-Objective Tolerance Optimization Considering Friction Loss for Internal Combustion Engines*** *Jizhou Zhang, Jianhua Zhou, Mian LI, Min Xu, Shanghai Jiao Tong University*
2:00 p.m.	***2017-01-0251***	***Multidisciplinary Design Optimization of Automobile Tail Door*** *Suneel Kumar Sharma, Ashish Kumar Sahu, Subhash Bhosale, Mahindra & Mahindra Ltd.*

2:30 p.m.		***BREAK***
3:00 p.m.	***ORAL ONLY***	***Network Target Coordination - Underhood and battery layout coordination*** *Georges M. Fadel, Clemson Univ.*
3:30 p.m.	***2017-01-0255***	***Optimization of structural adhesives in BIW to improve full vehicle crash performance*** *Malli Kartheek Yalamanchili, Nitin Sharma, Kevin Thomson, FCA US LLC*
4:00 p.m.	***2017-01-0256***	***A Corrected Surrogate Model Based Multidisciplinary Design Optimization Method under Uncertainty*** *Xianhe Wu, Chongqing Changan Automobile Co., Ltd.; Yudong Fang, Zhenfei Zhan, Xu Liu, Gang Guo, Chongqing University*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Tuesday, April 4

Additive (3D Printing) Manufacturing (Part 1 of 2)

Session Code: ***IDM302***

Room 312 A ***Session Time:*** ***8:00 a.m.***

This session deals with the manufacture of detail parts through laser sintering, stereo lithography, fused deposition modeling, and other emerging technologies. The session will explore technologies and methods for producing net or near net parts in various resins, plastics and metals directly from a CAD model that could employ design architectures that couldn't be achieved by other manufacturing methods.

Organizers - *Randy Gu, Oakland Univ.; Yu J. Teng, BAIC*

Chairpersons - *Yu Teng, BAIC*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***3D Printing: Transforming Automotive Manufacturing - Now and In the Future*** *Jim Vurpillat, Stratasys Inc.*
8:30 a.m.	***2017-01-0285***	***A Hardness Study on Laser Cladded Surfaces for a Selected Bead Overlap Conditions*** *Navid Nazemi, CAMufacturing Solutions Inc; Mohammad K. Alam, Ruth Jill Urbanic, Syed Saqib, Afsaneh Edrisy, University of Windsor*
9:00 a.m.	***ORAL ONLY***	***Leveraging Metal 3D Printing for Production Parts*** *Josh Parker, Proto Labs Inc*
9:30 a.m.		***BREAK***
10:00 a.m.	***ORAL ONLY***	***To Infinite Build and Beyond: Printing for Automotive Applications*** *Giuseppe D. Lacaria, Ellen Lee, Ford Motor Company*
10:30 a.m.	***2017-01-0286***	***Direct Laser Metal Deposition of Al 7050 Alloy*** *Amrinder Singh, Abhishek Ramakrishnan, Guru Dinda, Wayne State University*
11:00 a.m.	***ORAL ONLY***	***Towards an industry standard schema and best practice for managing additive manufacturing data*** *Najib Baig, Deborah Mies, Will Marsden, Granta Design Ltd*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Tuesday, April 4

Additive (3D Printing) Manufacturing (Part 2 of 2)

Session Code: ***IDM302***

Room 312 A ***Session Time:*** ***1:00 p.m.***

This session deals with the manufacture of detail parts through laser sintering, stereo lithography, fused deposition modeling, and other emerging technologies. The session will explore technologies and methods for producing net or near net parts in various resins, plastics and metals directly from a CAD model that could employ design architectures that couldn't be achieved by other manufacturing methods.

Organizers - *Randy Gu, Oakland Univ.; Yu J. Teng, BAIC*

Chairpersons - *Randy Gu, Oakland Univ; Jared Song, General Motors LLC*

Time	Paper No.	Title
1:00 p.m.	ORAL ONLY	**Design and Tuning of Square Pyramid Lattices for Stereolithography** *Siddharthan Selvasekar, Ford Motor Company*
1:30 p.m.	2017-01-0283	**Investigating Process Parameters and Microhardness Predictive Modeling Approaches for Single Bead 420 Stainless Steel Laser Cladding** *Mohammad K. Alam, University of Windsor; Navid Nazemi, CAMufacturing Solutions Inc.; Ruth Jill Urbanic, Syed Saqib, Afsaneh Edrisy, University of Windsor*
2:00 p.m.	2017-01-0284	**The Effect of the Cell Shape on Compressive Mechanical Behavior of 3D Printed Extruded Cross-Sections** *Sajjad Raeisi, Purdue University*

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Tuesday, April 4

Business Modeling/Operation Research/Big Data Analytics (Part 1 of 4)

Session Code: ***IDM110***

Room 312 B ***Session Time:*** ***8:00 a.m.***

Business Modeling/Operation Research/Big Data Analytics are key enablers for the next wave of innovation and growth across most industries and will address complex issues and systems that involve multiple objectives, alternatives, trade-offs, and large amounts of data and situations involving uncertainty or risk. This session will address new technical advances in these areas and provide valuable insights through the applications of real-world case studies.

Organizers - *Zhen Jiang, Yan Fu, Ford Motor Company; Ramakrishna Koganti, Ramk Inc.*

Time	Paper No.	Title
8:00 a.m.	2017-01-0237	**Planning Flexible Maintenance for Heavy Trucks using Machine Learning Models, Constraint Programming, and Route Optimization** *Jonas Biteus, Scania CV AB; Tony Lindgren, Stockholm University*
8:30 a.m.	2017-01-0242	**Using an Assembly Sequencing Application to React to a Production Constraint: a Case Study** *Yakov Fradkin, Michel Cordonnier, Andrew Henry, David Newton, Ford Motor Company*
9:30 a.m.		**BREAK**
10:00 a.m.	2017-01-0233	**A Data-Driven Diagnostic System Utilizing Manufacturing Data Mining and Analytics** *Weihong Guo, Shenghan Guo, Rutgers University; Hui Wang, Ford Motor Company; Xiao Yu, Optimal CAE; Annette Januszczak, Saumuy Suriano, Ford Motor Company*

10:30 a.m.	***ORAL ONLY***	***Scheduling Prototype Vehicle Safety Crash Tests with Constrained Optimization Approach*** *Jae Young Jung, Ford Motor Company; Yuhui Shi, University of Michigan, Ann Arbor; Yan Fu, Ford Motor Company*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Tuesday, April 4

Business Modeling/Operation Research/Big Data Analytics (Part 2 of 4)

Session Code: ***IDM110***

Room 312 B ***Session Time:*** ***1:00 p.m.***

Business Modeling/Operation Research/Big Data Analytics are key enablers for the next wave of innovation and growth across most industries and will address complex issues and systems that involve multiple objectives, alternatives, trade-offs, and large amounts of data and situations involving uncertainty or risk. This session will address new technical advances in these areas and provide valuable insights through the applications of real-world case studies.

Organizers - *Zhen Jiang, Yan Fu, Ford Motor Company; Ramakrishna Koganti, Ramk Inc.*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-0232***	***Utilizing Public Vehicle Travel Survey Data Sets for Vehicle Driving Pattern and Fuel Economy Studies*** *Nizar Khemri, Hao Ying, Wayne State University; Joseph Supina, Fazal Syed, Ford Motor Company*
1:30 p.m.	***2017-01-0246***	***Cost-Effective Reduction of Greenhouse Gas Emissions via Cross-Sector Purchases of Renewable Energy Certificates*** *Sentao Miao, Xiuli Chao, University of Michigan; Michael Tamor, Yan Fu, Margaret Strumolo, Ford Motor Company*
2:00 p.m.	***2017-01-0239***	***Big Data Analysis of Battery Charge Power Limit Impact on Electric Vehicle Driving Range while Considering Driving Behavior*** *Seth Bryan, Maria Guido, David Ostrowski, N. Khalid Ahmed, Ford Motor Company*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0241***	***A Novel Approach to Create Dimensional Tolerance Requirements from Expert Knowledge*** *Thiago B. Murari, Paulo Ungaretti, Ford Motor Company; Marcelo A. Moret, SENAI Cimatec*
3:30 p.m.	***2017-01-0236***	***Statistical Characterization, Pattern Identification, and Analysis of Big Data*** *Zhigang Wei, Tenneco Inc.; Kamran Nikbin, Imperial College London*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Tuesday, April 4

Design Optimization - Methods and Applications (Part 1 of 3)

Session Code: ***SS103***

Room 313 A ***Session Time:*** ***8:00 a.m.***

Design Optimization Methods and Application session features presentations on new and improved optimization techniques and on application of different optimization methods in component and vehicle design. Methods include deterministic and stochastic optimization techniques. Applications range from noise pressure optimization and vehicle dynamic response optimization to sub-system topology and shape and full vehicle gage and topology optimization.

Organizers - *Mallikarjuna Bennur, Chandan Mozumder, Vesna Savic, General Motors LLC*

Time	Paper No.	Title
8:00 a.m.	***ORAL ONLY***	***Technical Keynote: MDO and the V-Diagram: Moving from Component-Level Optimization to Enterprise-Wide System-Level Collaborative Multidisciplinary Optimization and Process Orchestration*** *Nader Fateh, Esteco North America Inc.*
9:00 a.m.	***ORAL ONLY***	***Integrated Topology Optimization and Additive Manufacturing of Vehicle Components*** *Shikui Chen, Topology Research Institute; Ren-Jye Yang, Ching-Hung Chuang, Hongyi Xu, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1342***	***Design of Automotive Structures Using Multi-Model Optimization*** *Nicolas Zagorski, Eric Nelson, Altair Product Design; Ari Caliskan, Allen Li, Ford Motor Company*
11:00 a.m.	***ORAL ONLY***	***A Holistic Approach to Address the Development Challenges of Complete Vehicle Weight Reduction*** *Neil McGregor, Ricardo UK, Ltd.*

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Design Optimization - Methods and Applications (Part 2 of 3)

Session Code: ***SS103***

Room 313 A ***Session Time:*** ***1:00 p.m.***

Design Optimization Methods and Application session features presentations on new and improved optimization techniques and on application of different optimization methods in component and vehicle design. Methods include deterministic and stochastic optimization techniques. Applications range from noise pressure optimization and vehicle dynamic response optimization to sub-system topology and shape and full vehicle gage and topology optimization.

Organizers - *Mallikarjuna Bennur, Chandan Mozumder, Vesna Savic, General Motors LLC*

Time	Paper No.	Title
1:00 p.m.	***2017-01-1339***	***CFD Topology and Shape Optimization for Port Development of Integrated Exhaust Manifolds*** *Anselm Hopf, GÃ¼nter Bartsch, Frank KrÃ¤mer, Carsten Weber, Ford Motor Company*
1:30 p.m.	***2017-01-1345***	***Simplified approach for optimizing lightening holes in Truck frames for durability performance*** *Ramachandra bhat, Nitin Sharma, Clifford Rivard, Kevin Thomson, FCA US LLC*
2:00 p.m.	***2017-01-1348***	***A New Weight Reduction Lightening Holes Development Approach Based on Frame Durability Fatigue Performance*** *Barry (Baizhong) Lin, Ramachandra bhat, FCA US LLC; Shawn (Xianggang) Zhang, A123 Systems LLC; Taylor Sykes-Green, Howard University; Nitin Sharma, Kevin Thomson, FCA US LLC*

2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1338***	***Stable and Accurate LS-DYNA Simulations with Foam Material Models: Optimization of Finite Element Model Parameters*** *Karthik Ramaswamy, General Motors Technical Center India; Bhaskar Patham, SABIC; Vesna Savic, General Motors LLC; Biswajit Tripathy, General Motors Technical Center India*
3:30 p.m.	***2017-01-1349***	***Optimization of Contact Profiles using Super-Ellipse*** *Matthieu Duchemin, Cezar Tugui, Vincent Collee, MCE-5 Development*
4:00 p.m.	***2017-01-1347***	***A Novel Method Studying the Effects of Journal Straightness in Three-Dimensional Space on Lubrication of Bearing*** *Jianhua Zhou, Min Xu, Bao Wang, Shanghai Jiao Tong University*

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Reliability and Robust Design in Automotive Engineering: Reliability-Based Design Optimization and Robustness

Session Code: ***IDM102***

Room 313 B ***Session Time:*** ***8:00 a.m.***

This session will address theoretical developments and automotive applications in RBDO and Robust Design. Topics include: computational algorithms for efficient estimation of reliability, Monte Carlo simulation, Bayesian reliability, Dempster-Shafer Evidence Theory, and Multi-Disciplinary Optimization, among others.

Organizers - *Efstratios Nikolaidis, University Of Toledo; Zissimos Mourelatos, Oakland Univ.*

Chairpersons - *Efstratios Nikolaidis, University Of Toledo*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0194***	***Time-Dependent Reliability-Based Design Optimization of Vibratory Systems*** *Santosh Patil, Beta CAE Systems USA Inc; Dimitrios Papadimitriou, Zissimos Mourelatos, Oakland University*
8:30 a.m.	***2017-01-0196***	***Knowledge System Based Design-for-Reliability for Developing Connected Intelligent Products*** *Venkatesh Agaram, CIMdata Inc.*
9:00 a.m.	***2017-01-0195***	***Robust Optimization Design of Powertrain Mounting System for Vehicle NVH Performance*** *Lei Peng, Zhuo Wang, Yonglei Su, Xueliang Li, Jian Zhang, Changan Automobile Engineering Institute*

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Tuesday, April 4

Trends in Development of Accelerated Reliability and Durability Testing Technology

Session Code: ***IDM300***

Room 313 B ***Session Time:*** ***10:00 a.m.***

This session presents the theory, practices and technology used in development of trends in reliability and durability testing (ART/ADT) technology and accurate physical simulation for successful performance predicting. The purpose is covering a new ideas and unique approaches to simulation interaction of full field inputs, safety, and human factors, improvement the ART/ADT steps-components, implementation that leads to development dependability, reduce recalls, life cycle cost, time, etc.

Organizers - *Lev Klyatis, Sohar Inc.; Paul Lubinski, Thermo King Corp.; Zissimos Mourelatos, Oakland Univ.; Richard L. Sun, Lawrence Technological Univ.; Bryan Dodson, SKF*

Chairpersons - *Zissimos Mourelatos, Oakland Univ.*

Time	Paper No.	Title
10:00 a.m.	2017-01-0276	***Why Separate Simulation of Input Influences for Accelerated Reliability and Durability Testing is Not Effective?*** *Lev Klyatis, Sohar Inc.*
10:30 a.m.	2017-01-0275	***Accelerated Combined Stress Testing of Automotive Head Lamp Relays*** *N. Obuli Karthikeyan, N. Prajitha, P. Sethu Madhavan, Ashok Leyland Ltd.*

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Tuesday, April 4

Reliability and Robust Design in Automotive Engineering: Decision Under Uncertainty/Uncertainty Modeling

Session Code: ***IDM104***

Room 313 B ***Session Time:*** ***1:00 p.m.***

Methods for modeling uncertainty and decision making under uncertainty are presented in this session. Both theoretical developments and practical applications from the automotive industry are covered.

Organizers - *Paul Lubinski, Thermo King Corp.; Zissimos Mourelatos, Oakland Univ.; Efstratios Nikolaidis, University Of Toledo*

Chairpersons - *Annette Skowronska, US Army TARDEC*

Time	Paper No.	Title
1:00 p.m.	2017-01-0206	***Time-Dependent Reliability Analysis Using a Modified Composite Limit State Approach*** *Monica Majcher, US Army TARDEC; Zissimos Mourelatos, Vasiliki Tsianika, Oakland University*
1:30 p.m.	2017-01-0208	***Assessing the Value of Information for Multiple, Correlated Design Alternatives*** *Shawn P. Capser, Efstratios Nikolaidis, University of Toledo*
2:00 p.m.	2017-01-0207	***Mean-Value Second-Order Saddlepoint Approximation for Reliability Analysis*** *Dimitrios Papadimitriou, Zissimos Mourelatos, Oakland University*
2:30 p.m.		***BREAK***
3:00 p.m.	2017-01-0205	***Reliability and Resiliency Definitions for Smart Microgrids Based on Utility Theory*** *Annette Skowronska, US Army TARDEC; Vijitashwa Pandey, Kevin Weinert, Oakland University; David Gorsich, US Army RDECOM; Zissimos Mourelatos, Oakland University*

3:30 p.m.	***2017-01-0209***	***Warranty Forecasting of Repairable Systems for Different Production Patterns*** *Themistoklis Koutsellis; Zissimos Mourelatos, Oakland Univ.; Mohammad Hijawi, Huairui Guo, FCA US LLC; Matthew Castanier, US Army TARDEC*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Tuesday, April 4

Safety-Critical Systems (Part 1 of 3)

Session Code: ***AE403***

Room 320 ***Session Time:*** ***8:00 a.m.***

The focus of the session is on system safety analysis and design of safety-critical systems employing electronic controls. Topics include: implementation of safety-relevant systems, fail-safe strategies, distributed fault tolerant systems and hazard analysis. Application areas include: automotive active safety and alternative energy systems as well as avionics and mission management. Finally, the session addresses application of new or revised safety standards such as ISO 26262 and DO-178C.

Organizers - *Barbara J. Czerny, ZF - TRW; Joseph G. D'Ambrosio, GM R&D Center; Brian T. Murray, ZF - TRW; Markus Plankensteiner, TTTech. Computertechnik AG*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0066***	***Virtual FMEA and Its Application to Software Verification of Electric Power Steering System*** *Shogo Nakao, Hitachi, Ltd.; Akihiko Hyodo, Hitachi America Ltd.; Masaki Itabashi, Hitachi Automotive Systems, Ltd.; Tomio Sakashita, Hitachi Automotive Systems Americas, Inc; Shingo Obara, Tetsuya Uno, Hitachi Automotive Systems, Ltd.; Yasuo Sugure, Hitachi, Ltd.; Yoshinobu Fukano, Mitsuo Sasaki, Yoshihiro Miyazaki, Hitachi Automotive Systems, Ltd.*
8:30 a.m.	***2017-01-0051***	***Safety Analysis of Heterogeneous Software Models at Implementation Stage*** *Jean GODOT, Adil ALIF, FAAR Industry; SÃ©bastien Saudrais, Bertrand BARBEDETTE, Cherif LAROUCI, ESTACA*
9:00 a.m.	***ORAL ONLY***	***Is My Automotive Function Safe? A Systematic Approach to Functional Behaviour Analysis*** *Helen Monkhouse, HORIBA MIRA Ltd; Paul Wooderson, Horiba Mira Ltd; David Ward, HORIBA MIRA Ltd*
9:30 a.m.		***BREAK***
10:00 a.m.	***ORAL ONLY***	***Achieving bi-directional traceability for increasingly complex devices*** *Robert Bates, Mentor Graphics Corp*
10:30 a.m.	***2017-01-0063***	***PICASSOS â€“ Practical Applications of Automated Formal Methods to Safety Related Automotive Systems*** *John Botham, Ricardo UK Ltd.; Gunwant Dhadyalla, WMG, University of Warwick; Antony Powell, YorkMetrics Ltd.; Peter Miller, Johnson Matthey Battery Systems; Olivier Haas, Coventry University; David McGeoch, Jaguar Land Rover Ltd.; Arun Chakrapani Rao, WMG, University of Warwick; Colin O'Halloran, University of Oxford; Jaroslaw Kiec, Asif Farooq, Saman Poushpas, Ricardo UK Ltd.; Nick Tudor, D-RisQ Ltd.*
11:00 a.m.	***ORAL ONLY***	***FTA (Fault Tree Analysis) as a Design Tool*** *Hyung Ho Kim, SOLUTIONLINK*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Safety-Critical Systems (Part 2 of 3)

Session Code: ***AE403***

Room 320 ***Session Time:*** ***1:00 p.m.***

The focus of the session is on system safety analysis and design of safety-critical systems employing electronic controls. Topics include: implementation of safety-relevant systems, fail-safe strategies, distributed fault tolerant systems and hazard analysis. Application areas include: automotive active safety and alternative energy systems as well as avionics and mission management. Finally, the session addresses application of new or revised safety standards such as ISO 26262 and DO-178C.

Organizers - *Barbara J. Czerny, ZF - TRW; Joseph G. D'Ambrosio, GM R&D Center; Brian T. Murray, ZF - TRW; Markus Plankensteiner, TTTech. Computertechnik AG*

Time	Paper No.	Title
1:00 p.m.	***2017-01-0065***	***A Model-driven Approach for Dependent Failure Analysis in Consideration of Multicore Processors using Modified Architecture Description Language (ADL)*** *BÃ¼lent Sari, ZF Friedrichshafen AG; Hans-Christian Reuss, University of Stuttgart / FKFS*
1:30 p.m.	***ORAL ONLY***	***Can Uncertified Microprocessors be used to Build Certified Systems?*** *Robert Bates, Mentor Graphics Corp*
2:00 p.m.	***2017-01-0054***	***Finding All Potential Run-Time Errors and Data Races in Automotive Software*** *Daniel Kaestner, Absint Angewandte Informatik GmbH; Antoine MinÃ©, University Pierre and Marie Curie; AndrÃ©Schmidt, Heinz Hille, Daimler AG; Laurent Mauborgne, Stephan Wilhelm, Absint Angewandte Informatik GmbH; Xavier Rival, JÃ©Ã´me Feret, INRIA/ENS; Patrick Cousot, New York University; Christian Ferdinand, Absint Angewandte Informatik GmbH*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0052***	***Markov Chain-based Reliability Analysis for Automotive Fail-Operational Systems*** *Andre Kohn, Rolf Schneider, AUDI AG; Antonio Vilela, Udo Dannebaum, Infineon Technologies AG; Andreas Herkersdorf, Technical University of Munich*
3:30 p.m.	***2017-01-0050***	***Bayesian Test Design for Reliability Assessments of Safety-Relevant Environment Sensors Considering Dependent Failures*** *Mario Berk, Technical University of Munich/ AUDI AG; Hans-Martin Kroll, Olaf Schubert, Boris Buschardt, AUDI AG; Daniel Straub, Technical University of Munich*
4:00 p.m.	***2017-01-0053***	***Redundant and Diverse Magnetic Field Digital Linear Hall Sensor Concept for ASIL D Applications*** *Wolfgang Granig, Friedrich Rasbornig, Dirk Hammerschmidt, Mario Motz, Thomas Zettler, Michael Strasser, Alessandro Michelutti, Infineon Technologies AG*
4:30 p.m.	***2017-01-0061***	***Risks of Lightning to Automotive Occupants and Electrical/Electronic Systems*** *Sultan A.M Alkhteeb, Shigeru Oho, Yuki Nagashima, Seisuke Nishimura, Hiroyuki Shimizu, Nippon Institute of Technology*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Driver Assistance Systems: Algorithms, Applications and Electronic Sensing (Part 1 of 3)

Session Code: ***AE401*** ***8:00 a.m.***

Room 321 ***Session Time:***

Advanced Driver Assistance Systems (ADAS) are gaining major importance all vehicle segments. The effectiveness of these systems is based upon the ability to not only sense the outside world and the ability to use the information intelligently. In this one-day session the sensing technologies and systems will be covered in the morning and the algorithms and applications will be discussed in the afternoon.

Organizers - *Yixin Chen, Changan US R & D; Ting Huang, Parker; Feilong Liu, General Motors; Scott Piper, General Motors LLC; Sara Dadras, Ford Motor Company*

Time	Paper No.	Title
8:00 a.m.	2017-01-0025	**A Novel Beamspace Technology Based On 2FCW for Radar Target Detection** *Takayuki Kitamura, Naotsugu Shimizu, Yasuyuki Miyake, DENSO Corporation*
8:30 a.m.	2017-01-0039	**Activation Timing of a Collision Avoidance System with V2V Communication** *Toshiya Hirose, Yasufumi Ohtsuka, Masato Gokan, Shibaura Institute of Technology*
9:00 a.m.	2017-01-0045	**Model Predictive Control for Feasible Region of Active Collision Avoidance** *Guirong Zhuo, Cheng Wu, Tongji Univ; Fengbo Zhang, HiRain Technology Co., Ltd.*
9:30 a.m.		**BREAK**
10:00 a.m.	2017-01-0024	**Development of Predictive Powertrain State Switching Control for Eco-Saving ACC** *Yuto Imanishi, Naoyuki Tashiro, Yoichi Iihoshi, Hitachi, Ltd.; Takashi Okada, Hitachi Automotive Systems, Ltd.*
10:30 a.m.	2017-01-0047	**3D Automotive Millimeter-Wave Radar with Two-Dimensional Electronic Scanning** *Jie Bai, Sihan CHEN, Hua Cui, Xin Bi, Libo Huang, Tongji University*
11:00 a.m.	2017-01-0031	**Effective Evaluation of Automated Driving Systems** *Mohamed Benmimoun, Ford Motor Company*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Driver Assistance Systems: Algorithms, Applications and Electronic Sensing (Part 2 of 3)

Session Code: ***AE401***

Room 321 ***Session Time:*** ***1:00 p.m.***

Advanced Driver Assistance Systems (ADAS) are gaining major importance all vehicle segments. The effectiveness of these systems is based upon the ability to not only sense the outside world and the ability to use the information intelligently. In this one-day session the sensing technologies and systems will be covered in the morning and the algorithms and applications will be discussed in the afternoon.

Organizers - *Yixin Chen, Changan US R & D; Ting Huang, Parker; Feilong Liu, General Motors; Scott Piper, General Motors LLC; Sara Dadras, Ford Motor Company*

Time	Paper No.	Title

1:00 p.m.	***2017-01-0046***	***Evaluation of a Stereo Visual Odometry Algorithm for Passenger Vehicle Navigation*** *Mohamed Aladem, Samir Rawashdeh, University of Michigan - Dearborn; Nathir Rawashdeh, German Jordanian University*
1:30 p.m.	***2017-01-0035***	***Vehicle Velocity Measurement Based on Image Registration*** *Binyu Mei, Xuexun Guo, Gangfeng Tan, Yongbing Xu, Mengying Yang, Wuhan University of Technology*
2:00 p.m.	***2017-01-0030***	***A Basic Study of a Driver's Gaze Area Detection System*** *Shunsuke Kogure, Takashi Kato, Shin Osuga, Aisin Seiki Co., Ltd.*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0043***	***Real-Time Robust Lane Marking Detection and Tracking for Degraded Lane Markings*** *Michael Smart, University of Waterloo; Satish Vaishnav, DENSO International America Inc.; Steven Waslander, University of Waterloo*
3:30 p.m.	***2017-01-0042***	***Lane Detection Using Orientation of Gradient and Vehicle Network Signals*** *David Andrade, Rodrigo Adamshuk, William Omoto, Felipe Franco, JoÃ£o Henrique Neme, Sergio Okida, Angelo Tusset, UTFPR-PG; Rodrigo Amaral, Artur Ventura, Fiat Chrysler Automobiles; Max Mauro Dias Santos, UTFPR-PG*
4:00 p.m.	***2017-01-0044***	***Analysis and Adaptive Estimation of Human Car Following Behavior for Advanced Driver Assistance Systems*** *Roman Schmied, Gunda Obereigner, Harald Waschl, Johannes Kepler University Linz*
4:30 p.m.	***2017-01-0037***	***Fuel-Efficient Driving for Motor Vehicles Based on Slope Recognition*** *Xianyao Ping, Gangfeng Tan, Yahui Wu, Binyu Mei, Yuxin Pang, Wuhan University of Technology*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

CAD/CAM/CAE Technology (Part 1 of 4)

Session Code: ***SS101***

Room 331 A ***Session Time:*** ***8:00 a.m.***

This session publishes papers and presentations advancing the knowledge in product design, manufacturing processes, and engineering analysis using the state-of-the-art computer technology. The scope includes such areas as CFD, manufacturing and assembly simulation, crash-worthiness, computational mechanics, mold flow, ride simulation, ergonomic design, NVH, reverse engineering, etc. Developments in numerical methods applicable to automotive engineering problems will also be considered.

Organizers - *Ke Su, General Motors LLC; Randy Gu, Oakland Univ.; Qichao Zheng, General Motors LLC; Yu J. Teng, BAIC; Jared Song, General Motors LLC*

Chairpersons - *Ke Su, General Motors LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Application of Coupled Eulerian Lagrangian Methods to Model Fluid Structure Interactions and Plugged Flows*** *Raju Gandikota, MindMesh Inc.*

8:30 a.m.	***2017-01-1319***	***Use of an Eulerian/Lagrangian Framework to Improve the Air Intake System of an Automobile with Respect to Snow Ingress*** *Christoph Huber, Bernhard Weigand, University of Stuttgart; Heinrich Reister, Thomas Binner, Daimler AG*
9:00 a.m.	***2017-01-1322***	***Prediction Method for Water Intrusion into the Engine Air Intake Duct while Running on Flooded Road at the Early Stage of Vehicle Development*** *Kunihiko Yoshitake, Hiroyuki Tateyama, Atsushi Ogawa, Honda R&D Co., Ltd.*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1327***	***Water Ingress Analysis and Splash Protection Evaluation for Vehicle Wading using Non-Classical CFD Simulation*** *Prashant Khapane, Vivek Chavan, Jaguar Land Rover; Uday Ganeshwade, Tata Technologies, Ltd.*
10:30 a.m.	***2017-01-1328***	***Development of Prediction Method for Engine Compartment Water Level by Using Coupled Multibody and Fluid Dynamics*** *Yoshiteru Tanaka, Jun Yamamura, Atsushi Murakawa, Hiroshi Tanaka, Tsuyoshi Yasuki, Toyota Motor Corporation*
11:00 a.m.	***2017-01-1318***	***Sand Dune Impact Simulation*** *Prashant Khapane, Jaguar Land Rover; Suresh Bhosale, Tata Technologies Ltd*

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

CAD/CAM/CAE Technology (Part 2 of 4)

Session Code: ***SS101***

Room 331 A ***Session Time:*** ***1:00 p.m.***

This session publishes papers and presentations advancing the knowledge in product design, manufacturing processes, and engineering analysis using the state-of-the-art computer technology. The scope includes such areas as CFD, manufacturing and assembly simulation, crash-worthiness, computational mechanics, mold flow, ride simulation, ergonomic design, NVH, reverse engineering, etc. Developments in numerical methods applicable to automotive engineering problems will also be considered.

Organizers - *Randy Gu, Oakland Univ.; Jared Song, Ke Su, General Motors LLC; Yu J. Teng, BAIC; Qichao Zheng, General Motors LLC*

Chairpersons - *Qichao Zheng, General Motors LLC*

Time	***Paper No.***	***Title***
1:00 p.m.	***ORAL ONLY***	***CAD Driven Morphing of Vehicle Structure and Subsystems*** *Rahul Makwana, Pratik G. Deshpande, Basant Sharma, Detroit Engineered Products (DEP) Inc.*
1:30 p.m.	***ORAL ONLY***	***CAD, CAE, CAM Optimization*** *Linda Cole, Open iT, Inc.*
2:00 p.m.	***2017-01-1335***	***Numerical Investigation of Jet-Wake and Secondary Flows in a Hydrodynamic Torque Converter*** *Jie Chen, Guangqiang Wu, Tongji University*
2:30 p.m.		***BREAK***

3:00 p.m.	***2017-01-1314***	***Towards a One Day Frame Model Build*** *Santhoji Katare, Dilip Reddy, Ford Motor Private Limited; Amar Ourchane, Ford Motor Company; Giri Nammalwar, Ford Motor Private Limited*
3:30 p.m.	***2017-01-1324***	***The Ecosystem for Engineering Design Applied to Formula SAE*** *Robert Jones, Portland State University; Baldur Steingrimsson, Portland State University and Imagars, LLC; Faryar Etesami, Sung Yi, Portland State University*
4:00 p.m.	***2017-01-1332***	***A Similarity Evaluation Metric for Mesh Based CAE Model Simplification and Its Application on Vehicle*** *Xin Yang, Zhenfei Zhan, Nanliang Jiang, Junqi Yang, Jun Lu, Chongqing University*
4:30 p.m.	***2017-01-1326***	***Leveraging Mathematical Models for Efficient Design of Chassis and Powertrain Systems*** *Santhoji Katare, Ravichandran S, Gokul Ram, Giri Nammalwar, Ford Motor Private Limited*

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Tuesday, April 4

Optical Measurement and Nondestructive Testing Techniques in Automotive EngineeringÂ

Session Code: ***M204***

Room 331 B ***Session Time:*** ***8:00 a.m.***

The session will cover optical based techniques/technologies for materials characterization, strain measurement, nondestructive testing, and validation of materials models.

Organizers - *Kah Wah Long, FCA US LLC; Sheng Liu, General Motors LLC; Lianxiang Yang, Oakland Univ.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0394***	***Effect of Pre-Strain on Edge Cracking Limit for Advanced High-Strength Steel Using Digital Image Correlation*** *Junrui Li, Ruiyan Yang, Zhen Li, Oakland University; Changqing Du, Dajun Zhou, FCA US LLC; Lianxiang Yang, Oakland University*
8:30 a.m.	***ORAL ONLY***	***DIC In-Situ of Tensile Deformation and Synchrotron Diffraction for the Accurate Investigation of Austenite-to-Martensite Transformation in AHSSs*** *Fadi Abu-Farha, Clemson Univ.; Xiaohua Hu, Pacific Northwest National Laboratory; Yang Ren, Argonne National Laboratory; Louis Gerard Hector, General Motors LLC; Xin Sun, Pacific Northwest National Labs*
9:00 a.m.	***2017-01-0396***	***Aluminum Sheet Springback (Side-Wall-Curl) Study*** *Guobiao Yang, Oakland University, Tongji University; Changqing Du, Dajun Zhou, FCA US LLC; Hao Wang, Elizabeth Lekarczyk, Lianxiang Yang, Oakland University*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0397***	***State-of-the-Art of CMM-Coordinate Metrology in Automotive Industry*** *Salah H. R. Ali, National Institute for Standards*

10:30 a.m.	***2017-01-0395***	***Surface Quality Inspection for Vehicle Front Panel Using Polarized Laser Inspection Method*** *Xin Xie, Lawrence Technological University; Danielle Zeng, Ford Motor Company; Boyang Zhang, Junrui Li, Oakland University; Liping Yan, Zhejiang Sci-Tech University; Lianxiang Yang, Oakland University*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 4

Advanced Analysis, Design, and Optimization of Materials, Restraints, and Structures for Enhanced Automotive Safety and Weight Reduction (Part 1 of 3)

Session Code: ***M202***

Room 331 B ***Session Time:*** ***1:00 p.m.***

Presentations in this session include, but are not limited to, innovative ideas to enhance automotive safety with improved material constitutive modeling, analysis method developments, simulation and pre/post processing tools, optimization techniques, crash code developments, finite element model updating, model validation and verification techniques, dummies and occupants, restraint systems, passive safety as well as lightweight material applications and designs.

Organizers - *Tau Tyan, Ford Motor Company; William J. Altenhof, Univ. of Windsor; Guofei Chen, United States Steel Corp.; Wei Li, General Motors LLC; Sheng-Dong Liu, Generalety LLC; Jwo Pan, University of Michigan*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-0364***	***Extensional Rheology: New Dimension of Characterizing Automotive Fluids*** *Hiroko Ohtani, Kevin Ellwood, Ford Motor Company; Gustavo Pereira, Thiago Chinen, CAPES Foundation; Siddharthan Selvasekar, Ford Motor Company*
1:30 p.m.	***2017-01-0365***	***Ductile Fracture from Spot Weld and Flange Edge in Advanced High Strength Steels*** *Kentaro Sato, JFE Steel Corp.; Takayuki Futatsuka, JFE Steel Corp; Jiro Hiramoto, JFE Steel Corp.; Kei Nagasaka, Akira Akita, Takeshi Kashiyama, Suzuki Motor Corp*
2:00 p.m.	***2017-01-0367***	***A New Combined Isotropic, Kinematic and Cross Hardening Model for Advanced High Strength Steel under Non-Linear Strain Loading Path*** *Yueqian Jia, Yu-wei Wang, AK Steel Corporation; Yuanli Bai, University of Central Florida*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0377***	***Experimental Observations on the Mechanical Response of AZ31B Magnesium and AA6061-T6 Aluminum Extrusions Subjected to Compression and Cutting Modes of Deformation*** *Peter Shery, William Altenhof, Ryan Smith, University of Windsor; Elmar Beeh, Philipp Strassburger, Thomas Gruenheid, German Aerospace Center DLR*
3:30 p.m.	***2017-01-0371***	***Establishing Failure Criterion for Elastomers through Improved Biaxial Testing*** *Raju Gandikota, MindMesh Inc.; Amit Nair, LSTC; Kurt Miller, Axel Products, Inc.*

4:00 p.m.	***2017-01-0372***	***Application of Nano-Indentation Test in Estimating Constituent Phase Properties for Microstructure-Based Modeling of Multiphase Steels*** *Guang Cheng, Kyoo Sil Choi, Xiaohua Hu, Xin Sun, Pacific Northwest National Laboratory*
4:30 p.m.	***2017-01-0378***	***Development of Carburizing Steel for Innovation in Parts Manufacturing Process*** *Yuta Imanami, Kunikazu Tomita, Kazuaki Fukuoka, Kimihiro Nishimura, JFE Steel Corp.*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 4

Heavy Duty Diesel Lubricants

Session Code: ***PFL350***

Room 332 ***Session Time:*** ***8:00 a.m.***

This session reviews advancements in heavy-duty engine oil technology and test methodology, focusing on achieving future emissions, durability and fuel efficiency expectations both in North America and Europe.

Organizers - *Jason Andersen, PACCAR Inc.; Ewa Bardasz, Energetics; Michael D. Kass, Oak Ridge National Laboratory*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0883***	***Study on Lubricating Oil Consumption from Evaporation of Oil-film on Cylinder Wall for Diesel Engine*** *Mitsuhiro Soejima, Kyushu Sangyo University; Yasuo Harigaya, Utsunomiya University; Toshiro Hamatake, Oita University; Yutaro Wakuri, Kyushu University*
8:30 a.m.	***2017-01-0884***	***The Development of Fuel Economy Test Method for Heavy Duty Diesel Engine Oil (The First HD Engine Test Method and the New JASO DH-2F Category)*** *Ken Hashimoto, Kenji Tomizawa, Yoichiro Nakamura, Takashi Hashimoto, Hino Motors Ltd.; Takahiro Tatani, Atsushi Akamatsu, Ryuji Aoki, Cosmo Oil Lubricants Co., Ltd.; JASO Diesel Engine Oil Standard Revision Task Force*
9:00 a.m.	***2017-01-0885***	***Evaluating the Soot Handling Performance of Diesel Engine Oils through Optimized Engine Testing Protocol*** *Bhuvenesh Tyagi, Vishnu Vijayakumar, Shyam Singh, Ajay Kumar Sehgal, R Suresh, Indian Oil Corporation Limited*
9:30 a.m.	***2017-01-0886***	***Research on the Evaporation Characteristics of Cylinder oil of Low-speed 2-stroke Marine Engines*** *Liyan Feng, Ximing DI, Wuqiang LONG, Yao Wu, Chao Liu, Hang Lv, Dalian University of Technology*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0887***	***Correlating Laboratory Oil Coking Rig Tests to Diesel Engine Tests to Understand the Mechanisms Responsible for Turbocharger Compressor Coking*** *Dairene Uy, George Pranis, Anthony Morelli, Arup Gangopadhyay, Ford Motor Company; Alexander Michlberger, Nicholas Secue, Mike Kinzel, Tina Adams, Kevin Streck, Lubrizol Corp.; Michael Lance, Andrew Wereszczak, Oak Ridge National Laboratory*

11:00 a.m.	***2017-01-0888***	***Fuel economy benefits with the low viscosity engine oil formulations on small trucks - Chassis Dynamometer Tests***
		Prashant Kumar, Reji Mathai, Sanjeev KUMAR, Ashish Kachhawa, Ajay Kumar Sehgal, Snigdhamayee Praharaj, Indian Oil Corporation Limited

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Automotive Tribology

Session Code: ***M214***

Room 332 ***Session Time:*** ***1:00 p.m.***

This technical session focuses on fundamental and applied research that lowers frictional energy losses and enhances reliability and durability of automotive components. The topics include, but not limited to engine and drivetrain tribology, seals, bearing and gear lubrication, materials tribology, surface engineering, lubricants and additives, computer-aided tribology, tribotesting, as well as friction, wear and lubrication fundamentals.

Organizers - *Qian Zou, David Schall, Oakland Univ.; Rong Zhang, Schaeffler Group USA Inc.*

Time	***Paper No.***	***Title***
1:00 p.m.	***ORAL ONLY***	***Effects of Phosphorus Additives in Shock Absorber Fluid Application***
		Shuichi Sakanoue, Idemitsu Kosan Co., Ltd.
1:30 p.m.	***2017-01-0462***	***Lowering Friction in Timing Chain Drive Systems by Tuning Tensioner Materials***
		Marcel Meuwissen, DSM Ahead B.V.; Jippe Van Ruiten, DSM Engineering Plastics; Thijs Besseling, Robbert van Sluijs, DSM Ahead B.V.; Maik Broda, Brian Pearce, Ford Motor Company; Fenton I. O'Shea, BorgWarner Morse TEC
2:00 p.m.	***2017-01-0457***	***Quantitative Analysis of Leakage Suppression of DLC Coating on Piston Ring***
		Kenji Matsumoto, Hideharu Koga, Honda R&D Co., Ltd.
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0460***	***Development of Resin Overlay Bearing Material for Recent Automotive Engine***
		Erina Yasuda, Hiroki Kobayakawa, Seiji Amano, Yuto Otsuki, Tomohiro Ukai, Daido Metal Co., Ltd.
3:30 p.m.	***2017-01-0459***	***Experimental Investigation and Surface Characterization of a Developed Frictional Composite Material for Vehicle Brakes***
		Salah H. R. Ali, National Institute for Standards; Badr S. N. Azzam, T. A. Osman, A. M. Moustafa, Cairo University
4:00 p.m.	***2017-01-0464***	***Load and Lubricating Oil Effects on Friction of a PEO Coating at Different Sliding Velocities***
		Guang Wang, Xueyuan Nie, Jimi Tjong, University of Windsor

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 4

Load Simulation and Vehicle Performance: Tire and TerrainÂ

Session Code: ***M208*** ***8:00 a.m.***

Room 333 ***Session Time:***

Presentations in this session will focus on tire and terrain mechanics modeling for load simulations, tire model development, parameter identification, and sensitivity analyses, tire test development, road profile characterization, and effective road profile development. Also, discussed will be interactions between tire, suspension/steering/brake systems, and different terrains, spindle loads/travel variation characteristics from deterministic and rough roads, terramechanics, tire noise, rolling resistance and correlation studies.

Organizers - *Jennifer Melanie Bastiaan, Kettering Univ.; Jianfeng Ma, Saint Louis University; Mustafa Ali Arat, Saab Automobile AB; Emmanuel O. Bolarinwa, Coventry University; Xiaobo Yang, Oshkosh Corporation*

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	**Improvement of Cross-country Capability of All-wheel Drive Vehicles by Means of Decentralization of Regulation of Air Pressure in Tires** *Andrei Keller, Sergei Aliukov, Vitaliy Usikov, South Ural State University*
8:30 a.m.	ORAL ONLY	**Tire Modal Parameter Estimation Using Quadrature Picking Technique and Fitting Higher Order Prony Series to Tire Transient Responses Subjected to Impacts** *Yousof Azizi, Bridgestone Americas Tire Operations LLC; Robert Asper, Bridgestone Americas Inc; Prashanta Gautam, University Of Akron*
9:00 a.m.	2017-01-0413	**A Model-Based Approach for Investigating Tire-Pavement Friction Threshold Values** *Mustafa Ali Arat, NEVS; Emmanuel Bolarinwa, Coventry University*
9:30 a.m.		**BREAK**
10:00 a.m.	2017-01-0414	**In-Plane Parameter Relationship between the 2D and 3D Flexible Ring Tire Models** *Bin Li, Texas Tech University; Xiaobo Yang, Oshkosh Corporation; James Yang, Texas Tech University; Yunqing Zhang, Zeyu Ma, Huazhong University of Science and Technology*
10:30 a.m.	2017-01-0415	**Ride Analysis under a Random Road Model with Interval Parameters** *Xingxing Feng, Huazhong University of Science and Techology; Peijun Xu, Ebco Inc.; Penglei Fu, Yunqing Zhang, Huazhong University of Science and Technology*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 4

NVH CAE Analysis & Testing Correlations (Part 1 of 2)

Session Code: ***M211***

Room 333 ***Session Time:*** ***1:00 p.m.***

This session covers the development and application of numerical methods along with test correlation and optimization for NVH issues of full vehicle and vehicle subsystems. All structural components, subsystems and complete systems found in automotive vehicles will be considered. Topics include structure NVH, vibro-acoustics, wind noise and aeroacoustics, intake/exhaust and vehicle interior noise, sound quality etc.

Organizers - *Luohui Long, Ford Motor Company; Weiguo Zhang, FCA US LLC; Guangtian Gavin Song, Ford Motor Company; Honglu Wang, FCA US LLC*

Time	Paper No.	Title
1:00 p.m.	2017-01-0444	**A Case Study on Clean Side Duct Radiated Shell Noise Prediction** *Weiguo Zhang, Mark Likich, Brian Butler, FCA US LLC; John White, Altair ProductDesign*

1:30 p.m.	***2017-01-0441***	***A Numerical Study of Trailing Edge Serrations on Sunroof Buffeting Noise Reduction*** *Zhenyu Wang, Mei Zhuang, Ohio State University*
2:00 p.m.	***2017-01-0447***	***Bench Test Method for Fuel Tank Vent Valve Noise Induced by EVAP System Pressure Pulsation*** *Zhe Li, Mike Dong, Dennis Harrigan, Michael Gardner, Ford Motor Company*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0445***	***A Sensitivity Study on Inertance Frequency Response Function through Non-Parametric Variability Approach*** *Muthukumar Arunachalam, Arunkumar S, FCA Engineering India Pvt Ltd.,; PraveenKumar Sampath, EinNel Technologies; Abdul Haiyum, FCA Engineering India Pvt Ltd.,; Yash Khakhar, FCA US LLC*
3:30 p.m.	***Panel***	***Technical Expert Panel Discussion: NVH CAE and Testing Methodology in Vehicle Design*** *Learn more about the panelists* ***Organizers -*** *Guangtian Gavin Song, Ford Motor Company* ***Moderators -*** *Guangtian Gavin Song, Ford Motor Company* ***Panelists -*** *Jaimin Bai, Ford Motor Company; Hether Fedullo, Ford Motor Company; Robert Powell, Exa Corporation; Weiguo Zhang, FCA US LLC;*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Tuesday, April 4

Technical Expert Panel Discussion: NVH CAE and Testing Methodology in Vehicle Design

Session Code: ***M211***

Room 333 ***Session Time:*** ***3:30 p.m.***

Panelists will share their experience and perspectives on NVH CAE and testing for product development and advanced engineering research. The topics will cover structure NVH, vibro-acoustics, wind noise and aeroacoustics, intake/exhaust and vehicle interior noise, sound quality, etc. Questions are welcome to pose directly to the panelists.

Organizers - *Guangtian Gavin Song, Ford Motor Company*

Moderators - *Guangtian Gavin Song, Ford Motor Company*

Panelists - *Robert Powell, Exa Corporation; Jaimin Bai, Ford Motor Company; Hether Fedullo, Ford Motor Company; Weiguo Zhang, FCA US LLC;*

Time	***Paper No.***	***Title***
	ORAL ONLY	***Learn more about the Panelists*** *Guangtian Gavin Song, Ford Motor Company; Robert Powell, Exa Corporation; Jaimin Bai, Hether Fedullo, Ford Motor Company; Weiguo Zhang, FCA US LLC*

Tuesday, April 4

Automotive Polymeric, Plastic Components and Composites (Part 1 of 2)

Session Code: ***M300*** ***8:00 a.m.***

Room 334 ***Session Time:***

Presentations of this session will address the development of Polymeric Multi Material & Composite materials for automotive interiors and exteriors, powertrain components, as well as structural and non-structural applications. Focus is on design, processes, bonding and manufacturing technologies, as well as lightweighting strategies.

Organizers - *Somasekhar Bobba, Emile Homsi, SABIC Innovative Plastics; Robert Randolph Maynard, Celanese Corp.; Hamid Mortazavian, University of Michigan; Srikanth Pilla, Clemson Univ.; Bryant Tokarz, O-Flex Group Inc.; Holger G. Warth, Evonik Industries AG*

Chairpersons - *Emile Homsi, SABIC; Holger Warth, Evonik Industries AG*

Time	Paper No.	Title
8:00 a.m.	***ORAL ONLY***	***Next-Generation Automotive Applications with TepexÂ® a Lightweight Thermoplastic Composite*** *Palanivel Swaminathan, Lanxess Corp.*
8:30 a.m.	***ORAL ONLY***	***Light, tough and efficient - material solutions for direct paintable exterior composite parts*** *Sebastian de Nardo, Evonik Resource Efficiency GmbH; Leif Ickert, Eike Langkabel, Evonik Resource Efficiency Gmbh*
9:00 a.m.	***2017-01-0482***	***Alternative to Phthalate Plasticizer for PVC/NBR Formulation Used in Automotive Fuel System with Biodiesel*** *Cristiano Grings Herbert, Materials Engineering & Test; Luiz RogÃ©rio De Andrade Lima, Federal University of Bahia; Cristiane GonÃ§alves, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0484***	***OEM's Approach on Design and Evaluation of Plastic Clamps*** *Harchetan Singh Aneja, Harmeet Singh, Aashish Parmar, Rohan Sharma, Maruti Suzuki India Limited*
10:30 a.m.	***2017-01-0488***	***Establishing Failure Criterion for Elastomers Through Improved Bi-axial Testing*** *Raju Gandikota, MindMesh Inc.*
11:00 a.m.	***2017-01-0489***	***Study on Cycle Time Reduction of Injection Molding Using CAE*** *Hyunkwon Jo, Jongsoo Kim, Jaemin Park, Heeseung Yang, Hyunmin Park, Seoyon E-Hwa*

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Tuesday, April 4

Automotive Polymeric, Plastic Components and Composites (Part 2 of 2)

Session Code: ***M300***

Room 334 ***Session Time:*** ***1:00 p.m.***

Presentations of this session will address the development of Polymeric Multi Material & Composite materials for automotive interiors and exteriors, powertrain components, as well as structural and non-structural applications. Focus is on design, processes, bonding and manufacturing technologies, as well as lightweighting strategies.

Organizers - *Somasekhar Bobba, Emile Homsi, SABIC Innovative Plastics; Robert Randolph Maynard, Celanese Corp.; Hamid Mortazavian, University of Michigan; Srikanth Pilla, Clemson Univ.; Bryant Tokarz, O-Flex Group Inc.; Holger G. Warth, Evonik Industries AG*

Chairpersons - *Emile Homsi, SABIC; Holger Warth, Evonik Industries AG*

Time	Paper No.	Title

1:00 p.m.	***ORAL ONLY***	***Low-Density and Electrically Conductive Polymer Composites That Can Be Injection-Molded*** *Craig Reeder, Helge Schmidt, Andreas Athans, Martin Bayes, TE Connectivity*
1:30 p.m.	***2017-01-0481***	***Weld Line Factors for Thermoplastics*** *Xian Jun Sun, Patricia Tibbenham, Jin Zhou, Danielle Zeng, Shiyao Huang, Li Lu, Xuming Su, Ford Motor Company*
2:00 p.m.	***2017-01-0490***	***Mechanical Properties of Biorenewable Blends of Polyamide 10,10 and Polyamide 6,10*** *Rodrigo Polkowski, Ford Motor Company/UFS-P2CEM-DCEM; Alper Kiziltas, Ford Motor Company; Marcelo Ueki, Federal University of Sergipe/P2CEM-DCEM*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0487***	***Effects of sticking force on sealing property of rubber gasket at low temperature*** *Daisuke Hyodo, Kiyohiro Suzuki, Toshiyuki Tsutsumi, Kuriyama Hideki, NOK Corporation*

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Tuesday, April 4

UV/EB Leading the Way for the Future of Automotive (Part 1 of 2)

Session Code: ***M401***

Room 336 ***Session Time:*** ***8:00 a.m.***

Success in cure technology attained through advances photocurable materials, UV Laser technology, lamp development, 3D computer imaging, and the development of novel materials, processes and facilities, are significantly advancing the efforts of energy reduction and vehicle lightweighting resulting in improvements of reduced GHG emissions, manufacturing Cycle Time, Small Footprint manufacturing, speedy proto-type development and Additive Manufacturing, all creating a revolution in manufacturing.

Organizers - *Gary Cohen, Radtech International North America; Mary Ellen Rosenberger, BaySpring Solutions LLC; Christopher Seubert, Ford Motor Company*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***3D Printing: Automotive Update on Successes & Challenges*** *Emily Ryan, Ford Motor Co., Ltd.*
8:30 a.m.	***ORAL ONLY***	***New Nanosilica Polyether UV curable Resins for Automotive Applications*** *Ziniu Yu, BASF*
9:00 a.m.	***ORAL ONLY***	***UV + PVD: Performance and Design Solutions for the Automotive Industry*** *Eileen Weber, Red Spot Paint & Varnish Co. Inc.*
9:30 a.m.		***BREAK***
10:00 a.m.	***ORAL ONLY***	***UV Hardcoat Technology: Vision of Future Possibilities in Improving Vehicle Durability*** *Gary Williams, Red Spot Paint & Varnish Co. Inc.*
10:30 a.m.	***ORAL ONLY***	***UV EB Solutions that Drive GHG Saving and Small Foot-Print Automotive Paint Shop Solutions*** *Mary Ellen Rosenberger, BaySpring Solutions LLC*

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Tuesday, April 4

UV/EB Leading the Way for the Future of Automotive (Part 2 of 2)

Session Code: ***M401***

Room 336 ***Session Time:*** ***1:00 p.m.***

Success in cure technology attained through advances photocurable materials, UV Laser technology, lamp development, 3D computer imaging, and the development of novel materials, processes and facilities, are significantly advancing the efforts of energy reduction and vehicle lightweighting resulting in improvements of reduced GHG emissions, manufacturing Cycle Time, Small Footprint manufacturing, speedy proto-type development and Additive Manufacturing, all creating a revolution in manufacturing.

Organizers - *Gary Cohen, Radtech International North America; Mary Ellen Rosenberger, BaySpring Solutions LLC; Christopher Seubert, Ford Motor Company*

Time	Paper No.	Title
1:00 p.m.	ORAL ONLY	**Weathering and Corrosion Testing in the Automotive Industry: An Overview of Todayâ€™s Requirements** *Andy Francis, Q-Lab. Corporation*
1:30 p.m.	ORAL ONLY	**UV Functional Coatings for Automotive Displays** *Aneta Bogdanova, Luo Zhengsong, Songwei Lu, Irina Schwendeman, Yang Wenfu, Song Yuanjie, PPG Industries*
2:00 p.m.	ORAL ONLY	**UV Curing Applications for the Automotive Industry: Past, Present, and Future** *Kevin Joesel, Heraeus Noblelight*
2:30 p.m.		**BREAK**
3:00 p.m.	ORAL ONLY	**Enhanced Corrosion Performance and Finishing Productivity for Automobile and Truck Components: Henkel Bonderite M-PP 966 Coating Used with Keyland Polymer Ultra Violet (UV) Cured Powder Coatings** *Todd Coggins, Henkel; Michael Knoblauch, Keyland Polymer, Ltd.*

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Tuesday, April 4

Sheet Metal Forming Technology (Part 1 of 4)

Session Code: ***M105***

Room 338 ***Session Time:*** ***8:00 a.m.***

This session will feature the latest developments in sheet metal forming technology. Presentations will address general areas of forming processes, formability issues and modeling. These include forming processes (Stamping, hydroforming, gas forming, high temperature forming), formability Issues (springback, edge cracking, stretch-bend failures and fracture), Modeling (materials, forming limits, failure criteria in various deformation modes and process modeling & optimization).

Organizers - *Xiaoming Chen, US Steel; Thomas Oetjens, CAE International Inc.; ZiQiang Sheng, General Motors LLC; Michael J. Worswick, University of Waterloo; Dajun Zhou*

Time	Paper No.	Title
8:00 a.m.	2017-01-0302	**Analysis of Tool Wear for Trimming of DP980 Sheet Metal Blanks** *Saeid Nasheralahkami, Sergey Golovashchenko, Scott Dawson, Oakland University; Raj Sohmshetty, Ford Motor Company*

8:30 a.m.	***2017-01-0306***	***Practical Application of the Hole Expansion Test*** *Brandon M. Hance, United States Steel Corporation*
9:00 a.m.	***2017-01-0311***	***Impact of Servo Press Motion on Hole Flanging of High Strength Steels*** *Pedro Stemler, Ohio State University; Anoop Samant, KTH Parts Industries; Dennis Hofmann, Taylan Altan, Ohio State University*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0307***	***The Role of Second Phase Hard Particles on Hole Stretchability of Two AA6xxx Alloys*** *Xiaohua Hu, Xin Sun, Pacific Northwest National Laboratory; Sergey Golovashchenko, Oakland University*
10:30 a.m.	***ORAL ONLY***	***Micromechanics Modeling to Predict Sheared Edge Failure of Advanced High Strength Steels*** *Nikky Pathak, university of waterloo; Cliff Butcher, Michael Worswick, University of Waterloo*
11:00 a.m.	***ORAL ONLY***	***Characterization of Edges and its Effect on Fracture in Sheet Metal Tensile Testing*** *Ameer Shawk, Pengyan Lu, Linda Ye, Xin Wu, Wayne State University*

Planned by Metallic Materials Committee / Materials Engineering Activity

Tuesday, April 4

Sheet Metal Forming Technology (Part 2 of 4)

Session Code: ***M105***

Room 338 ***Session Time:*** ***1:00 p.m.***

This session will feature the latest developments in sheet metal forming technology. Presentations will address general areas of forming processes, formability issues and modeling. These include forming processes (Stamping, hydroforming, gas forming, high temperature forming), formability Issues (springback, edge cracking, stretch-bend failures and fracture), Modeling (materials, forming limits, failure criteria in various deformation modes and process modeling & optimization).

Organizers - *Xiaoming Chen, US Steel; Thomas Oetjens, CAE International Inc.; ZiQiang Sheng, General Motors LLC; Michael J. Worswick, University of Waterloo; Dajun Zhou*

Time	***Paper No.***	***Title***
1:00 p.m.	***ORAL ONLY***	***Development of a Material Model for the Die Quenching Properties of AA7075*** *Kaab Omer, Samuel kim, Cliff Butcher, Michael Worswick, University of Waterloo*
1:30 p.m.	***ORAL ONLY***	***Constructing Forming Limit Surfaces for AA7xxx Sheets for Hot Stamping Studies*** *Fadi Abu-Farha, Clemson Univ.*
2:00 p.m.	***2017-01-0310***	***Evaluation of Prog-Die Wear Properties on Bare DP1180 Steel*** *Wei Wu, AK Steel Corporation; Dajun Zhou, FCA US LLC; Donald Adamski, General Motors Company; Darryl Young, Ford Motor Company; Yu-Wei Wang, AK Steel Corporation*
2:30 p.m.		***BREAK***

3:00 p.m.	***2017-01-0303***	***Surface Fatigue Cracking Behavior of a CrN-Coated Tool Steel Influenced by Sliding Cycles and Sliding Energy Density*** *Ran Cai, Beijing Institute of Technology; Xueyuan Nie, Jingzeng Zhang, University of Windsor*
3:30 p.m.	***ORAL ONLY***	***Elastic and Plastic Anisotropy of Mild and Advanced High Strength Steel Sheets*** *Nengxiu Deng, Univ. of New Hampshire; Yannis Korkolis, Univ of New Hampshire*

Planned by Metallic Materials Committee / Materials Engineering Activity

Tuesday, April 4

Autonomous Systems (Part 1 of 4)

Session Code: ***AE506***

Room 353 ***Session Time:*** ***8:00 a.m.***

In addition to increasing access to personal mobility, automated vehicles aim to increase driving safety. However there are challenges on the road to developing the automated systems. This session addresses the technical challenges which include robust static and dynamic object detection, path planning, driving strategy, system architecture choices, simulation tool development, etc.

Organizers - *Sue Bai, Honda; Geoff Bauer, Continental Corp.; Sara Dadras, Ford Motor Company; Linson Qiao, Continental Corp.*

Chairpersons - *Sue Bai, Honda; Sara Dadras, Ford Motor Company*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Scalable, platform-independent software architectures for ADAS and automated driving*** *Kai R. Richter, Marek Jersak, Maurice Sebastian, Luxoft*
8:30 a.m.	***2017-01-0112***	***Method to Optimize Key Parameters and Effectiveness Evaluation of the AEB System Based on Rear-End Collision Accidents*** *Mingming Zhao, Hongyan Wang, Tong Ji Univ; Junyi Chen, Tong Ji Univ.; Xiao Xu, Tong Ji Univ; Yutong He, SHUFO*
9:00 a.m.	***2017-01-0102***	***A Lane Departure Estimating Algorithm Based on Camera Vision, Inertial Navigation Sensor and GPS Data*** *Mahdi Heydari, Feng Dang, Ankit Goila, Yang Wang, Hanlong Yang, AVL Powertrain Engineering Inc*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0118***	***Obstacle Avoidance Strategy and Implementation for Unmanned Ground Vehicle Using LIDAR*** *Yang Wang, Ankit Goila, Rahul Shetty, Mahdi Heydari, Ambarish Desai, Hanlong Yang, AVL Powertrain Engineering Inc*
10:30 a.m.	***2017-01-0116***	***ADAS Feature Concepts Development Framework via a Low Cost RC Car*** *Ankit Goila, Ambarish Desai, Feng Dang, Jian Dong, Rahul Shetty, Rakesh Babu Kailasa, Mahdi Heydari, Yang Wang, Yue Sun, Manikanta Jonnalagadda, Mohammed Alhasan, Hanlong Yang, AVL Powertrain Engineering Inc; Katherine R. Lastoskie, University of Michigan*
11:00 a.m.	***2017-01-0111***	***Impact of Different Desired Velocity Profiles and Controller Gains on Convoy Driveability of Cooperative Adaptive Cruise Control Operated Platoons*** *Santhosh Tamilarasan, Levent Guvenc, The Ohio State University*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Autonomous Systems (Part 2 of 4)

Session Code: ***AE506***

Room 353 ***Session Time:*** ***1:00 p.m.***

In addition to increasing access to personal mobility, automated vehicles aim to increase driving safety. However there are challenges on the road to developing the automated systems. This session addresses the technical challenges which include robust static and dynamic object detection, path planning, driving strategy, system architecture choices, simulation tool development, etc.

Organizers - *Sue Bai, Honda; Geoff Bauer, Continental Corp.; Sara Dadras, Ford Motor Company; Linson Qiao, Continental Corp.*

Chairpersons - *Sue Bai, Honda; Sara Dadras, Ford Motor Company*

Time	Paper No.	Title
1:00 p.m.	***Panel***	***Technical Expert Panel Discussion: Automated Vehicle Systems*** *Learn more about the panelists* ***Moderators -*** *Sue Bai, Honda; Geoff Bauer, Continental Corp.* ***Panelists -*** *Colm Boran, Ford Motor Company; Mark Lynn, Delphi Corp.; Jeremy McClain, Continental Automotive Systems US Inc.; Justyna Zander, NVIDIA;*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0108***	***Comfortable Automated Emergency Brake for Urban Traffic Light Based on DSRC and On-Board Sensors*** *Zaydounr Y. Rawashdeh, Trong-Duy Nguyen, Anoop Pottammal, Rajesh Malhan, DENSO International America Inc.*
3:30 p.m.	***2017-01-0107***	***Creating 3D Virtual Driving Environments for Simulation-Aided Development of Autonomous Driving and Active Safety*** *Arvind Jayaraman, MathWorks; Ashley Micks, Ethan Gross, Ford Motor Company*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Model-Based Controls and Software Development (Part 1 of 2)

Session Code: ***AE103***

Room 354 ***Session Time:*** ***8:00 a.m.***

Model-Based Design has become a well-accepted development style for embedded control and software. This session is designed to cover new processes, methods, and applications of new processes / methods to reduce development time and improve software quality. A particular emphasis will be placed on methods such as executable specification, design through simulation, early verification, automatic code generation, and model-in-the-loop testing.

Organizers - *Vivek Moudgal, dSPACE Inc.; Wensi Jin, MathWorks Inc.; Mahendra Muli, dSPACE Inc.*

Chairpersons - *Vivek Moudgal, dSPACE Inc.*

Time	Paper No.	Title
8:00 a.m.	2017-01-0008	**Approaches to Determining Beneficial Use of Simulink and UML in Automotive Embedded Software Systems** *James Andrew Miloser, Ford Motor Company*
8:30 a.m.	2017-01-0001	**The Model Integration and Hardware-in-the-Loop (HiL) Simulation Design for the Analysis of a Power-Split Hybrid Electric Vehicle with Electrochemical Battery Model** *Ming Cheng, Bo Chen, Michigan Technological University*
9:00 a.m.	2017-01-0002	**Requirement Modeling of Pro Trailer Backup Assistâ„¢** *Nate Rolfes, Ford Motor Company*
9:30 a.m.		**BREAK**
10:00 a.m.	2017-01-0005	**Real-Time Hardware-in-the-Loop Simulation for Drivability Development** *Yun Liu, Sung-Kwon Hong, Tony Ge, Ford Motor Company*
10:30 a.m.	2017-01-0007	**A Model-Based <italic>Design Thinking</italic> Strategy for in-Vehicle Infotainment Features Development** *Jose-Guillermo Saavedra, Asaad Makki, Raciel Cruz, Ford Motor Company*
11:00 a.m.	2017-01-0009	**Centralized Lifecycle Management of Model-Based Software Artifacts** *Raymond Turin, John Mills, Jeremy Mangas, SimuQuest Inc; Eileen Davidson, William P. Milam, Thomas Erickson, Ford Motor Company*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Model-Based Controls and Software Development (Part 2 of 2)

Session Code: ***AE103***

Room 354 ***Session Time:*** ***1:00 p.m.***

Model-Based Design has become a well-accepted development style for embedded control and software. This session is designed to cover new processes, methods, and applications of new processes / methods to reduce development time and improve software quality. A particular emphasis will be placed on methods such as executable specification, design through simulation, early verification, automatic code generation, and model-in-the-loop testing.

Organizers - *Vivek Moudgal, dSPACE Inc.; Wensi Jin, MathWorks Inc.; Mahendra Muli, dSPACE Inc.*

Chairpersons - *Vivek Moudgal, dSPACE Inc.*

Time	Paper No.	Title
1:00 p.m.	2017-01-0006	**An Integrated Approach Enabling Cross-Domain Simulation of Model-Based E/E-Architectures** *Harald Bucher, Karlsruhe Institute Of Technology (KIT); Clemens Reichmann, Vector Informatik GmbH; Juergen Becker, Karlsruhe Institute Of Technology (KIT)*
1:30 p.m.	2017-01-0004	**Arttestâ€“a New Test Environment for Model-Based Software Development** *Norbert Wiechowski, RWTH Aachen University; Thomas Rambow, Rainer Busch, Ford Motor Company; Alexander Kugler, Norman Hansen, Stefan Kowalewski, RWTH Aachen University*

2:00 p.m.	***2017-01-0003***	***Criteria-Driven Approach in Automotive Software Development â€' Integrating Concepts of Formal Methods with Testing*** *Tetsuya Tohdo, DENSO Corporation*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0010***	***Transfer Function Generation for Model Abstraction Using Static Analysis*** *Vinay Vaidya, VMAS Consulting; Ramesh S, General Motors LLC; Venkatesh Kareti, Smitha K.P., Priti Ranadive, KPIT Technologies Ltd*
3:30 p.m.	***ORAL ONLY***	***High Fidelity Micro Controller and Electronic Control Units Models and Tools (Virtual Platforms) How Virtual Platforms can accelerate SW Development*** *Paolo Giusto, General Motors LLC*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Electronics Design Processes (Part 1 of 2)

Session Code: ***AE107***

Room 356 ***Session Time:*** ***8:00 a.m.***

Meeting Reliability, Design, quality and safety requirements for electrical/electronic systems becomes more challenging every year as E/E content, complexity, time-to-market and globalization pressures increase. This session focuses on intelligent practices for achieving high reliability. New approaches and techniques for integrating robust design and robustness validation into the mainstream global automotive electronics product development and manufacturing processes are discussed

Organizers - *Abraham Shocket, Lyle Stanley Bryan, TE Connectivity*

Chairpersons - *Abraham Shocket, Lyle Stanley Bryan, TE Connectivity*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0016***	***Power MOSFET Technologies and Design Considerations for Automotive Electronic Systems*** *Don Zaremba, Emily Linehan, Carlos Ramirez Ramos, ON Semiconductor*
8:30 a.m.	***2017-01-0012***	***Shielded Gate Trench Technology for Achieving the Best Performing Automotive MOSFETs in Medium Voltage Applications*** *Zia Hossain, Shengling Deng, Jim Sellers, Gary Loechelt, Mo Grimaldi, Irene Wan, Emily Linehan, Alexander Young, Ali Salih, ON Semiconductor*
9:00 a.m.	***2017-01-0011***	***Solder Void Modeling and Its Influence on Thermal Characteristics of MOSFETs in Automotive Electronics Module*** *Kesav Kumar Sridharan, Swaminathan Viswanathan, Delphi Automotive Systems*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0013***	***Experimental Study and Design to Overcome the Problem of Flickering Issues in Electrical Components in Automotive Vehicles*** *Gaurav Gupta, Ujjwal Modi, VE Commercial Vehicles Ltd.*
10:30 a.m.	***2017-01-0014***	***Prediction Method for Automobile EMI Test Result in AM Frequency Band*** *Takashi Nomura, Kazuma Kawai, DENSO Corporation*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Electronics Design Processes (Part 2 of 2)

Session Code: ***AE107***

Room 356 ***Session Time:*** ***1:00 p.m.***

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Organizers - *Abraham Shocket, Lyle Stanley Bryan, TE Connectivity*

Chairpersons - *Abraham Shocket, Lyle Stanley Bryan, TE Connectivity*

Time	Paper No.	Title
1:00 p.m.	2017-01-0015	**Calculation of Failure Detection Probability on Safety Mechanisms of Correlated Sensor Signals According to ISO 26262** *Wolfgang Granig, Dirk Hammerschmidt, Infineon Technologies AG; Hubert Zangl, Alpe-Adria University Klagenfurt*
1:30 p.m.	ORAL ONLY	**Substrate Technologies for Power Modules** *Sam Lin, Sadamichi Takakusaki, ON Semiconductor*
2:00 p.m.	ORAL ONLY	**Driving Smart Power Integration with eFuse (Electronic Fuse) Technology** *Sudhama Shastri, Jeremy Correale, Deres Eshete, ON Semiconductor*

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Tuesday, April 4

Vehicle to Infrastructure (Part 1 of 2)

Session Code: ***AE503***

Room 357 ***Session Time:*** ***8:00 a.m.***

This session discusses what the deployment of vehicle-to-infrastructure (V2I) is about, potential and status quo of V2I deployment, and vehicles will work with deployed infrastructure for bette rmobility solutions. In addition to demonstrations with latest deployments, (potential) applications and possible issues and their solutions will also be addressed in this session. It is a session bringing both vehicle and infrastructure sides together for better transportation services.

Organizers - *Walton L. Fehr, WFET Group; Jan-Mou Li, Oak Ridge National Laboratory; Joseph Zagroba, Continental*

Chairpersons - *Jan-Mou Li, Oak Ridge National Laboratory*

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	**A Connected World in Motion** *Monali Shah, HERE Chicago*
8:30 a.m.	ORAL ONLY	**Improvement of Truck Performance with V2I connectivity at Signalized Intersections** *Jan-Mou Li, Oak Ridge National Laboratory*
9:00 a.m.	ORAL ONLY	**Next generation of wireless network for ITS applications** *Walton L. Fehr, US Dept. of Transportation*
9:30 a.m.		**BREAK**

10:00 a.m.	***ORAL ONLY***	***Stranger in a Strange Land: Automated Vehicles on Human-Centric Roads***
		Carl Andersen, Federal Highway Administration
10:30 a.m.	***ORAL ONLY***	***V2I: The Status of State Infrastructure Activities***
		Blaine Leonard, Utah Department of Transportation

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Vehicle to Infrastructure (Part 2 of 2)

Session Code: ***AE503***

Room 357 ***Session Time:*** ***1:00 p.m.***

This session discusses what the deployment of vehicle-to-infrastructure (V2I) is about, potential and status quo of V2I deployment, and how vehicles will work with the infrastructure deployed for better solutions of mobility. In addition to demonstrations with latest deployments, (potential) applications and possible issues and their solutions will also be addressed in this session. It is a session bringing both vehicle and infrastructure sides together for better transportation services.

Organizers - *Walton L. Fehr, WFET Group; Jan-Mou Li, Oak Ridge National Laboratory; Joseph Zagroba, Continental*

Chairpersons - *Jan-Mou Li, Oak Ridge National Laboratory*

Time	***Paper No.***	***Title***
1:00 p.m.	***ORAL ONLY***	***Innovating DSRC Field Technologies and Data Sharing Methods to Accelerate Street Level Deployment of Connected Vehicles and Features***
		Jeffery W. Branham, Ernie Lucas Pierce, City of Knoxville
1:30 p.m.	***ORAL ONLY***	***New York City (NYC) Connected Vehicle (CV) Pilot Program***
		NYC is one of three Connected Vehicle (CV) pilot deployment sites selected by USDOT to demonstrate the benefits of this new Connected Vehicle technology. The other two sites are in Wyoming, which focuses on interstate routes and commercial vehicles, and Tampa, which will be testing a number of applications in a mid-sized urban environment on a relatively small number of vehicles.
		Mohamad Talas, NYC DOT Traffic Operations
2:00 p.m.	***ORAL ONLY***	***Managing Change in Traffic Operations with Respect to Connected and Autonomous Vehicle Technologies, Perspectives from the Tennessee Department of Transportation***
		Brad Freeze, Tennessee Dept. of Transportation
2:30 p.m.		***BREAK***

3:00 p.m. ***ORAL ONLY*** ***V2I and Advanced Mobility Developments in Michigan***

The Michigan Department of Transportation has been aggressively supporting and deploying V2I initiatives that promise to contribute to improvements in mobility and safety throughout the state. Over the past year, MDOT has successfully partnered and developed the ability to support signal-based applications (such as Red Light Violation Warning) and a freeway-based work zone reduced lane warning application, supported V2V truck platooning by providing â€œconnectedâ€ vehicles with work zone and incident information, has continued to outfit fleet vehicles with the equipment needed to interact with a â€œconnected environmentâ€, and supported ground-breaking legislation supporting the testing and operation of automated and driverless vehicles in the state. Over the next year, MDOT will continue our aggressive deployments by developing additional highly-capable V2I corridors, and further developing and deploying V2I applications within the state.

Matthew Smith, Michigan Dept. of Transportation

3:30 p.m. ***ORAL ONLY*** ***V2I Deployment Coalition: Progress and Outcomes***

In early 2015, the Vehicle to Infrastructure Deployment Coalition (V2I DC) was created as a partnership between AASHTO, ITE, and ITS America with support from USDOT. Since this time, the V2I DC has been a centralized forum for public, private, and academic stakeholders to meet and discuss V2I deployment related topics and issues. Recently, the V2I DC wrapped up Phase 1 efforts and is currently transitioning into Phase 2. This presentation will introduce audience members to the V2I DC, describe the key activities and outcomes of Phase 1, and describe the current plans for Phase 2. In addition, the presentation will describe the unique situation in which the National Operations Center of Excellence (NOCoE) and groups within AASHTO, ITE, and ITS America interact with and support V2I DC efforts. Finally, the presentation will describe Colorado specific V2I deployments planned and underway that leverage the outcomes of the V2I DC.

Shailen P. Bhatt, Colorado Dept. of Transportation

4:00 p.m. ***Panel*** ***Technical Expert Panel Discussion: V2I Deployment â€“ Public Sector Perspective***

Vehicle to Infrastructure (V2I) provides unique opportunities/challenges for DOTs. This panel of representatives from federal/state/local DOTs share their V2I deployment plans, and views on how V2I contributes to the improvement of transportation. This panel provides a rare opportunity for the vehicle and infrastructure leaders to discuss the essential components of V2I. Panelists will share their views on partnering with automotive industry to create more connected transportation systems.

Moderators - *Walton L. Fehr, WFET Group; Jan-Mou Li, Oak Ridge National Laboratory*

Panelists - *Carl Andersen, Federal Highway Administration; Shailen P. Bhatt, Colorado Dept. of Transportation; Jeffery W. Branham, City of Knoxville; Brad Freeze, Tennessee Dept. of Transportation; Blaine Leonard, Utah Department of Transportation; Matthew Smith, Michigan Dept. of Transportation; Mohamad Talas, NYC DOT Traffic Operations;*

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Tuesday, April 4

Technical Expert Panel Discussion: V2I Deployment â€“ Public Sector Perspective

Session Code: ***AE503***

Room 357 ***Session Time: 4:00 p.m.***

Vehicle to Infrastructure (V2I) provides unique opportunities/challenges for DOTs. This panel of representatives from federal/state/local DOTs share their V2I deployment plans, and views on how V2I contributes to the improvement of transportation. This panel provides a rare opportunity for the vehicle and infrastructure leaders to discuss the essential components of V2I. Panelists will share their views on partnering with automotive industry to create more connected transportation systems.

Moderators - *Walton L. Fehr, WFET Group; Jan-Mou Li, Oak Ridge National Laboratory*

Panelists - *Carl Andersen, Federal Highway Administration; Shailen P. Bhatt, Colorado Dept. of Transportation; Jeffery W. Branham, City of Knoxville; Brad Freeze, Tennessee Dept. of Transportation; Blaine Leonard, Utah Department of Transportation; Matthew Smith, Michigan Dept. of Transportation; Mohamad Talas, NYC DOT Traffic Operations;*

Tuesday, April 4

Vehicle Networks and Communication (Part 1 of 2)

Session Code: ***AE201***

Room 358 ***Session Time: 8:00 a.m.***

Vehicle networks and communication protocols play a key role in meeting today's complex system requirements and product flexibility. This session will explore the challenges and future prospects for vehicle communication networks and protocols. Papers are sought in the areas of network design, protocol design, network-enabled vehicle functions, network integration, network and protocol testing, network bus technology, CAN, CAN-FD, J1939, Ethernet, FlexRay.

Organizers - *Christopher Lupini, Delphi Corp.; Mark Zachos, DG Technologies*

Time	Paper No.	Title
8:00 a.m.	***ORAL ONLY***	***Technical Keynote: In-Vehicle Network Architectures Enabling Secure On-Board Diagnostics Connections*** *The presenters will review current in-vehicle network architectures and spotlight future technology trends. As in-vehicle network architectures advance, the new technology enables more sophisticated system diagnostics. Insuring trusted connections between the vehicle and off board diagnostics devices also requires the evolution of diagnostics methods which should support continuously evolving cyber security protection mechanisms.* *Christopher Lupini, Delphi Corp.; Mark Zachos, DG Technologies*
9:00 a.m.	***2017-01-0022***	***Standardization of In-Vehicle Networks: An Inside Look into the Next Generation of Communication Systems*** *Holger Zeltwanger, CAN in Automation*
9:30 a.m.		***BREAK***
10:00 a.m.	***ORAL ONLY***	***HDBaseT - The Highway for In-vehicle Connectivity*** *Ilan Shaari, Valens*
10:30 a.m.	***2017-01-0018***	***Vehicle Controller Area Network Response Time Analysis and Measurement Issues - to Reduce the Gap between Estimation and Measurement*** *Jeong Chan Kim, Hyundai Autron Company; Kai Richter, Symtavision GmbH; Myung Hyun Koo, Hyundai Autron Company; Matthias Hagner, Symtavision GmbH; Chung Hi Lee, Hyundai & Kia Corp.*
11:00 a.m.	***2017-01-0020***	***Securing J1939 Communications Using Strong Encryption with FIPS 140-2*** *Mark Zachos, DG Technologies*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Vehicle Networks and Communication (Part 2 of 2)

Session Code: ***AE201***

Room 358 ***Session Time:*** ***1:00 p.m.***

Vehicle networks and communication protocols play a key role in meeting today's complex system requirements and product flexibility. This session will explore the challenges and future prospects for vehicle communication networks and protocols. Papers are sought in the areas of network design, protocol design, network-enabled vehicle functions, network integration, network and protocol testing, network bus technology, CAN, CAN-FD, J1939, Ethernet, FlexRay.

Organizers - *Christopher Lupini, Delphi Corp.; Mark Zachos, DG Technologies*

Time	Paper No.	Title
1:00 p.m.	***2017-01-0021***	***Technique of ECU Circuit Design Management for Automotive Ethernet*** *Takashi Yasuda, Hideki Goto, Hiroki Keino, Kaoru Yoshida, Toyota Motor Corp.; Hiroyuki Mori, Miyuki Mizoguchi, NIPPON SOKEN, INC.*
1:30 p.m.	***2017-01-0023***	***Virtual Development for In-Vehicle Network Topology â€“ A Case Study of CAN FD Physical Layer*** *Naoya Tsuchiya, Tomohisa Kishigami, Eiichirou Kawakami, DENSO Corporation*
2:00 p.m.	***2017-01-0019***	***Network Scheduling for Distributed Controls of Electric Vehicles Considering Actuator Dynamic Characteristics*** *Yang Zhao, Weiwen Deng, Jian Wu, Rui He, Jilin University, ASCL*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Vehicle to Vehicle

Session Code: ***AE502***

Room 359 ***Session Time:*** ***8:00 a.m.***

V2V Communications for Safety is a key component in the USDOT's Vehicle to Vehicle Communications program, and is complemented by research programs that support connectivity among vehicles and infrastructure (V2I) and among vehicles and consumer devices (V2D) to deliver safety and mobility benefits.

Organizers - *Jan-Mou Li, Oak Ridge National Laboratory; David McNamara, Brandmotion LLC; Joseph Zagroba, Continental*

Chairpersons - *David McNamara, Brandmotion LLC; Joseph Zagroba, Continental*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0073***	***Hazard Warning Performance in Light of Vehicle Positioning Accuracy and Map-Less Approach Path Matching*** *Andreas Barthels, Christian Ress, Martin Wiecker, Manfred MÃ¼ller, Ford Motor Company*
8:30 a.m.	***2017-01-0075***	***Display System for Vehicle to Pedestrian Communication*** *Shinya Kitayama, Toshiyuki Kondou, Hirokazu Ohyabu, Masaaki Hirose, Haneda Narihiro, Ryuta Maeda, DENSO Corporation*
9:00 a.m.	***2017-01-0077***	***Performance of DSRC during Safety Pilot Model Deployment*** *Scott E. Bogard, Shan Bao, David LeBlanc, University of Michigan - Ann Arbor; Jun Li, Shaobo Qiu, Bin Liu, FAW Group Corporation - China*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Intelligent Vehicle Initiative

Session Code: ***AE501***

Room 359 ***Session Time:*** ***1:00 p.m.***

This session presents papers by leading experts in the field of Intelligent Vehicle Technologies, such as: vehicle communications and networks, driver drowsiness and driving pattern detection, sensors and GPS, vehicle and chassis control and autonomous vehicles, route prediction, head-up displays and power transmission for electric vehicles.

Organizers - *Ehsan Moradi-Pari, Honda R & D Americas Inc.; Mohammad Naserian, General Motors LLC; Kenneth W. Webster, Transportation Research Center Inc.*

Time	Paper No.	Title
1:00 p.m.	2017-01-0068	**VoGe: A Voice and Gesture System for Interacting with Autonomous Cars** *Pablo Sauras-Perez, Andrea Gil, Jasprit Singh Gill, Pierluigi Pisu, Clemson University; Joachim Taiber, ITIC*
2:00 p.m.	2017-01-0070	**Teaching Autonomous Vehicles How to Drive under Sensing Exceptions by Human Driving Demonstrations** *Longxiang Guo, Clemson University; Sagar Manglani, Clemson-ICAR; Xuehao Li, Yunyi Jia, Clemson University*
2:30 p.m.		**BREAK**
3:00 p.m.	2017-01-0071	**Distance Map Estimation of Stereoscopic Images Using Deep Neural Networks for Autonomous Vehicle Driving** *Vahid Taimouri, Michel Cordonnier, Kyoung Min Lee, Bryan Goodman, Ford Motor Company*
3:30 p.m.	2017-01-0072	**Free-Positioned Smartphone Sensing for Vehicle Dynamics Estimation** *Yang Zheng, Navid Shokouhi, University of Texas at Dallas; Amardeep Sathyanarayana, Texas Instruments Inc.; John Hansen, University of Texas at Dallas*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Tuesday, April 4

Electric Motor & Power Electronics (Part 1 of 5)

Session Code: ***PFL740***

Room 410 B ***Session Time:*** ***8:00 a.m.***

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification.

Organizers - *John Czubay, General Motors; Laura Marlino, Oak Ridge National Laboratory; Constantine N. Raptis, GM Powertrain; Serdar Yonak, Ford Motor Company*

Time	Paper No.	Title
8:00 a.m.	2017-01-1228	**Development of High Efficiency Rectifier with MOSFET in â€œSC Alternatorâ€**

Masaya Nakanishi, DENSO Corporation

8:30 a.m.	***2017-01-1240***	***Development of a New MOS Rectifier for High-Efficiency Alternators*** *Koki Matsushita, DENSO Corporation*
9:00 a.m.	***2017-01-1229***	***The Development of ECU-Integrated Electric Oil Pump for Powertrain*** *Ken Yamamoto, Nobuyasu Sadakata, Hidetoshi Okada, Yusuke Fujita, MITSUBA Corporation*
9:30 a.m.	***2017-01-1221***	***Magnetic Form of Heavy Rare-Earth Free Motor for Hybrid Electric Vehicle*** *Shingo Soma, Haruhiko shimizu, Eiji Shirado, Satoshi Fujishiro, Honda R&D Co., Ltd.*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1225***	***Spray-Formed Hybrid-Field Traction Motor*** *Jayaraman Krishnasamy, Martin Hosek, Persimmon Technologies Corporation*
11:00 a.m.	***2017-01-1249***	***Self-Excited Wound-Field Synchronous Motors for xEV*** *Masahiro Seguchi, DENSO Corporation*
11:30 a.m.	***2017-01-1232***	***The Development of Direct Drive Motors for Solar Cars*** *Tsubasa Yamazakii, Hidekazu Uchiyama, Kazuaki Nakazawa, Tsubasa Isomura, Hisashi Ogata, Mitsuba Corp.*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Electric Motor & Power Electronics (Part 2 of 5)

Session Code: ***PFL740***

Room 410 B ***Session Time:*** ***1:30 p.m.***

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification.

Organizers - *John Czubay, General Motors; Laura Marlino, Oak Ridge National Laboratory; Constantine N. Raptis, GM Powertrain; Serdar Yonak, Ford Motor Company*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-1231***	***Current Harmonics Impact on Torque Ripple in PM Machine Drive System*** *Chun Tang, Natee Limsuwan, Nurani Chandrasekhar, Zhichun Ma, Jacob Krizan, Joel Hetrick, Wei Wu, Ford Motor Company*
2:00 p.m.	***2017-01-1226***	***Current Harmonics, Torque Ripple and Whine Noise of Electric Machine in Electrified Vehicle Applications*** *Nurani Chandrasekhar, Chun Tang, Natee Limsuwan, Joel Hetrick, Jacob Krizan, Zhichun Ma, Wei Wu, Ford Motor Company*
2:30 p.m.	***2017-01-1250***	***Analysis of Dynamic Characteristics of Full-Pitch-Winding Switched Reluctance Motor Based on Reluctance Network Analysis*** *Tomokazu Ishikawa, DENSO Corporation; Kouhei Ikebuchi, Kenji Nakamura, Osamu Ichinokura, Tohoku University; Naoki Kurimoto, Yoshiaki Nishijima, DENSO Corporation*
3:00 p.m.		***BREAK***

3:30 p.m.	***2017-01-1222***	***Study on Characteristics of Motor Output Power Depending on Current Sensor Response in Eco-Friendly Vehicles*** *Jeongwon Rho, Jeongbin Yim, Daewoong Han, Gubae Kang, Seongyeop Lim, Hyundai Motor Company*
4:00 p.m.	***2017-01-1230***	***Mechanical Drag Model for an Electric Machine*** *Cyrille Goldstein, Joel Hetrick, Ford Motor Company*
4:30 p.m.	***2017-01-1237***	***Identification of Permanent Magnet Synchronous Motor Parameters*** *Ahmad Arshan Khan, Michael J. Kress, Ford Motor Company*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Driveline Modeling (Part 1 of 2)

Session Code: ***PFL680***

Room 411 A ***Session Time:*** ***9:00 a.m.***

This session covers transmission and driveline modeling, including topics related to transmission hardware, software, and system integration.

Organizers - *Dongxu Li, Thomas Martin, General Motors LLC; David Popejoy, Ford Motor Company*

Time	***Paper No.***	***Title***
9:00 a.m.	***2017-01-1140***	***Piecewise 1st Order Hydraulic Actuator Model for Transient Transmission Simulations*** *Yang Xu, Yuji Fujii, Edward Dai, James McCallum, Gregory Pietron, Guang Wu, Hong Jiang, Ford Motor Company*
9:30 a.m.	***2017-01-1139***	***A Simulation Model for Predicting High Speed Torque Jump Up Phenomena of Disengaged Transmission Wet Clutch*** *Syeda Faria Mahmud, Shahjada Pahlovy, Masamitsu Kubota, Makoto Ogawa, Norio Takakura, Dynax Corporation*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1143***	***Bond Graph Based Approach for Modeling of Automatic Transmission Dynamics*** *Vladimir Ivanovic, H. Eric Tseng, Ford Motor Company*
11:00 a.m.	***2017-01-1142***	***A Bond Graph-Based Method of Automated Generation of Automatic Transmission Mathematical Model*** *Vanja Ranogajec, Josko Deur, University of Zagreb*
11:30 a.m.	***2017-01-1144***	***Automated Model Initialization Using Test Data*** *Jongryeol Jeong, Ram Vijayagopal, Aymeric Rousseau, Argonne National Laboratory*

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Driveline Modeling (Part 2 of 2)

Session Code: ***PFL680***

Room 411 A ***Session Time:*** ***1:30 p.m.***

This session covers transmission and driveline modeling, including topics related to transmission hardware, software, and system integration.

Organizers - *Dongxu Li, Thomas Martin, General Motors LLC; David Popejoy, Ford Motor Company*

Time	***Paper No.***	***Title***
2:00 p.m.	***2017-01-1136***	***CAE Predictions for Cardan Joint Induced Driveline NVH*** *Jack S.P. Liu, Natalie Remisoski, Javed Iqbal, Robert Egenolf, Ford Motor Company*
2:30 p.m.	***2017-01-1141***	***An Advanced Automatic Transmission with Interlocking Dog Clutches: High-Fidelity Modeling, Simulation and Validation*** *Bashar Alzuwayer, Robert Prucka, Imtiaz Haque, Paul Venhovens, Clemson University*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-1145***	***Hybrid Powertrain Operation Optimization Considering Cross Attribute Performance Metrics*** *Eric De Hesselle, Mark Grozde, Raymond Adamski, Thomas Rolewicz, Mark Erazo, Ford Motor Company*
4:00 p.m.	***2017-01-1138***	***Development of a Vehicle Model Architecture to Improve Modeling Flexibility*** *Gary Stevens, Martin Murtagh, Robert Kee, Juliana Early, Roy Douglas, Queen's University Belfast; Robert Best, Wrights Group Ltd.*

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Partially Premixed Compression Ignition, PPCI (Part 1 of 3)

Session Code: ***PFL250***

Room 411 B ***Session Time:*** ***8:00 a.m.***

Mixed mode with auto ignition but inhomogeneous charge. Injection-controlled but with EOI before SOC. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, combustion control, and PPC injection strategies are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL110 or PFL120 modeling sessions.

Organizers - *Adam B. Dempsey, Caterpillar; Antonio Garcia, CMT Motores Termicos Universidad; Bengt Johansson, King Abdullah Univ. of Science & Tech.; Derek Splitter, Oak Ridge National Laboratory*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Effects of Lambda and EGR on Emissions in Gasoline Compression-Ignition Combustion*** *Khanh Cung, Toby Rockstroh, Stephen Ciatti, Argonne National Laboratory*
8:30 a.m.	***2017-01-0742***	***Influence of Engine Speed on Gasoline Compression Ignition (GCI) Combustion in a Single-Cylinder Light-Duty Diesel Engine*** *Harsh Goyal, Sanghoon Kook, Evatt Hawkes, Qing Nian Chan, The University of New South Wales; Srinivas Padala, Yuji Ikeda, Imagineering Inc.*
9:00 a.m.	***2017-01-0743***	***Gasoline Fuels Assessment for Delphi's Second Generation Gasoline Direct-Injection Compression Ignition (GDCI) Multi-Cylinder Engine*** *Kukwon Cho, Eric Latimer, Matthew Lorey, David J. Cleary, Aramco Services Company; Mark Sellnau, Delphi Automotive Systems LLC*

9:30 a.m.	***2017-01-0745***	***Combustion Stratification for Naphtha from CI Combustion to PPC***
		R. Vallinayagam, S. Vedharaj, Yanzhao An, Alaaeldin Dawood, King Abdullah University of Science and Technology; Mohammad Izadi Najafabadi, Bart Somers, Eindhoven University Of Technology; Bengt Johansson, King Abdullah University of Science and Technology
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0746***	***Potential of Ozone to Enable Low Load Operations of a Gasoline Compression Ignition (GCI) Engine***
		Pietro Matteo Pinazzi, UniversitÃ©d'OrlÃ©ans; Fabrice Foucher
11:00 a.m.	***2017-01-0750***	***Experimental Study on the Potential of Higher Octane Number Fuels for Low Load Partially Premixed Combustion***
		Shuli Wang, Kyle van der Waart, Bart Somers, Philip de Goey, Eindhoven University of Technology

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Partially Premixed Compression Ignition, PPCI (Part 2 of 3)

Session Code: ***PFL250***

Room 411 B ***Session Time:*** ***1:30 p.m.***

Mixed mode with auto ignition but inhomogeneous charge. Injection-controlled but with EOI before SOC. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, combustion control, and PPC injection strategies are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL110 or PFL120 modeling sessions.

Organizers - *Adam B. Dempsey, Caterpillar; Antonio Garcia, CMT Motores Termicos Universidad; Bengt Johansson, King Abdullah Univ. of Science & Tech.; Derek Splitter, Oak Ridge National Laboratory*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0749***	***NOx Reduction in Compression-Ignition Engine by Inverted Ignition Phi-Sensitivity***
		Suya Gao, Mianzhi Wang, University of Illinois; Chia-Fon Lee, University of Illinois; Beijing Institute. of Technology
2:00 p.m.	***2017-01-0751***	***Simulation-Guided Air System Design for a Low Reactivity Gasoline-Like Fuel under Partially-Premixed Combustion in a Heavy-Duty Diesel Engine***
		Praveen Kumar, Yu Zhang, Michael Traver, David Cleary, Aramco Research Center
2:30 p.m.	***2017-01-0739***	***Numerical Investigation of PPCI Combustion at Low and High Charge Stratification Levels***
		Amin Maghbouli, Tommaso Lucchini, Gianluca D'Errico, Politecnico di Milano; Mohammad Izadi Najafabadi, Bart Somers, Eindhoven University of Technology
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0740***	***CFD-Guided Combustion Strategy Development for a Higher Reactivity Gasoline in a Light-Duty Gasoline Compression Ignition Engine***
		Yu Zhang, Yuanjiang Pei, Nayan Engineer, Kukwon Cho, David Cleary, Aramco Research Center - Detroit

4:00 p.m.	***2017-01-0741***	***Experimental and Modelling Investigations of the Gasoline Compression Ignition Combustion in Diesel Engine*** *Xinlei Liu, Laihui Tong, Hu Wang, Zunqing Zheng, Mingfa Yao, Tianjin University*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Powertrain Thermal Management: Combustion Chamber, Battery Cooling, and Engine Cooling (Part 1 of 2)

Session Code: ***PFL160***

Room 411 C ***Session Time:*** ***8:00 a.m.***

This session considers modeling (zero-D, 1D, 2D, 3D CFD) and experimental papers on: combustion chamber, systems (lubrication, cooling, fuel, EGR); components (oil pumps, coolant pump, fuel injectors, compressors, turbines, turbochargers, torque converters, gear box, fans, bearings, valves, ports, manifolds, turbine housing); heat exchangers (radiators, oil coolers); aftertreatment (SCR, DOC, DOF, exhaust gas cooling); battery cooling (HEV, EV, motor/generator) and controls (passive and active).

Organizers - *Tarek M. Abdel-Salam, East Carolina University; Bala K. Murthy, General Motors LLC; Raj Ranganathan, Simerics Inc.*

Chairpersons - *Giuseppe Cicalese, Universita di Modena e Reggio Emilia*

Time	***Paper No.***	***Title***
8:30 a.m.	***2017-01-0623***	***A Numerical Study of Radiator Performance under a Transient Thermal Cycle*** *Zun Wang, Yi Zhang, Ford Motor Company; Christophe lenormand, Mohammed Ansari, Manuel Henner, Valeo Thermal Systems*
9:00 a.m.	***2017-01-0624***	***Numerical and Experimental Investigation on Heat Exchange Performance for Heat Dissipation Module for Construction Vehicles*** *Jiaxin Liu, HUST and North China University of Science & Technology; Sicheng Qin, Jilin University; Yankun Jiang, Shumo He, Huazhong University of Science and Technology*
9:30 a.m.	***2017-01-0627***	***Comparison of Extended Life Coolant Corrosion Protection Performance*** *Bo Yang, Peter Woyciesjes, Aleksei Gershun, Prestone Products Corp.*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0631***	***A Research Study on a Curved Radiator Concept for Automotive Engine Cooling*** *David C. Ogbuaku, Timothy Potter, James M. Boileau, Ford Motor Company*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Powertrain Thermal Management: Combustion Chamber, Battery Cooling, and Engine Cooling (Part 2 of 2)

Session Code: ***PFL160***

Room 411 C ***Session Time:*** ***1:30 p.m.***

This session considers modeling (zero-D, 1D, 2D, 3D CFD) and experimental papers on: combustion chamber, systems (lubrication, cooling, fuel, EGR); components (oil pumps, coolant pump, fuel injectors, compressors, turbines, turbochargers, torque converters, gear box, fans, bearings, valves, ports, manifolds, turbine housing); heat exchangers (radiators, oil coolers); aftertreatment (SCR, DOC, DOF, exhaust gas cooling); battery cooling (HEV, EV, motor/generator) and controls (passive and active).

Organizers - *Tarek M. Abdel-Salam, East Carolina University; Bala K. Murthy, General Motors LLC; Raj Ranganathan, Simerics Inc.*

Time	Paper No.	Title
1:30 p.m.	2017-01-0622	**HEV Battery Pack Thermal Management Design and Packaging Solutions** *Sury Janarthanam, Sarav Paramasivam, Patrick Maguire, James Gebbie, Douglas Hughes, Ford Motor Company*
2:00 p.m.	2017-01-0626	**Method and System to Simulate Battery Pack Key-Off Thermal Behavior after Aggressive Drive Cycles** *LeeAnn Wang, George Garfinkel, Ahteram Khan, Ford Motor Company; Mayur Harsha, Prashanth Rao, Roush Industries*
2:30 p.m.	2017-01-0629	**A Segregated Thermal Analysis Method for Liquid-Cooled Traction Batteries** *John Kuo, George Garfinkel, Ford Motor Company*
3:00 p.m.		**BREAK**
3:30 p.m.	ORAL ONLY	**Development considerations and targets for lithium-ion battery thermal management in electrified vehicle applications** *Brian Robert, Ford Motor Company*
4:00 p.m.	2017-01-0625	**Experimental Investigations Into Free-Circular Upward-Impinging Oil-Jet Heat Transfer of Automotive Pistons** *Yen-Chung Liu, Brian Sangeorzan, Alex Alkidas, Oakland University*
4:30 p.m.	2017-01-0621	**Improved Modeling of Near-Wall Heat Transport for Cooling of Electric and Hybrid Powertrain Components by High Prandtl Number Flow** *Sanjin Saric, Andreas Ennemoser, Branislav Basara, Heinz Petutschnig, AVL LIST GmbH; Christoph Irrenfried, Helfried Steiner, GÃ¼nter Brenn, Graz University of Technology*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

0-D and 1-D Modeling and Numerics (Part 1 of 6) - Models for Air & exhaust management and air-borne noise

Session Code: ***PFL110***

Room 412 A ***Session Time:*** ***8:00 a.m.***

Separate sub-sessions cover zero-dimensional, one-dimensional, and quasi-dimensional models for simulation of SI and CI engines with respect to: engine breathing, boosting, and acoustics; SI combustion and emissions; CI combustion and emissions; fundamentals of engine thermodynamics; numerical modeling of gas dynamics; thermal management; mechanical and lubrication systems; system level models for controls; system level models for vehicle fuel economy and emissions predictions.

Organizers - *Fabio Bozza, Univ. of Naples; Michael L. Briggs; Federico Millo, Politecnico di Torino; Christof Schemus, FEV Europe GmbH*

Time	Paper No.	Title

8:00 a.m.	***2017-01-0514***	***A 1D/Quasi-3D Coupled Model for the Simulation of I.C. Engines: Development and Application of an Automatic Cell-Network Generator*** *Augusto Della Torre, Gianluca Montenegro, Tarcisio Cerri, Angelo Onorati, Politecnico di Milano*
8:30 a.m.	***2017-01-0520***	***1D-3D Coupled Simulation of the Fuel Spray Propagation Inside the Air-Box of a Moto3 Motorbike: Analysis of Spray Targeting and Injection Timing*** *Gianluca Montenegro, Augusto Della Torre, Tarcisio Cerri, Angelo Onorati, Lorenzo Nocivelli, Politecnico di Milano; Marco Fiocco, Mahindra Racing S.P.A.*
9:00 a.m.	***2017-01-0513***	***Fast 2-D Heat Transfer Model for Computing Internal Temperatures in Automotive Turbochargers*** *Jose Serrano, Universitat Politecnica de Catalunya; Luis Miguel GarcÃ-a-Cuevas Ing, Universitat PolitÃ¨cnica de ValÃ¨ncia; Andres Tiseira, Universitat PolitÃ¨cnica de Valencia; Tatiana Rodriguez Usaquen, Universitat PolitÃ¨cnica de ValÃ¨ncia; Guillaume Mijotte, Groupe Renault*
9:30 a.m.	***2017-01-0526***	***Thermodynamic Potential of Electrical Turbocharging for the Case of Small Passenger Car ICE under Steady Operation*** *Oldrich Vitek, Jan Macek, Czech Technical University*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0531***	***Effects of Differential Pressure Sensor Gauge-Lines and Measurement Accuracy on Low Pressure EGR Estimation Error in SI Engines*** *Rani Kiwan, Anna Stefanopoulou, Jason Martz, University of Michigan; Gopichandra Surnilla, Imtiaz Ali, Daniel Styles, Ford Motor Company*
11:00 a.m.	***2017-01-0530***	***Pressure Ratio Influence on Exhaust Valve Flow Coefficients*** *Ted Holmberg, Andreas Cronhjort, KTH Royal Institute of Technology; Ola Stenlaas, Scania CV AB*
11:30 a.m.	***2017-01-0535***	***An EGR Cooler Fouling Model: Experimental Correlation and Model Uses*** *Chih-Kuang Kuan, Daniel Styles, Ford Motor Company; Mitchell Bieniek, John Hoard, University of Michigan*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

0-D and 1-D Modeling and Numerics (Part 3 of 6) Models for CI Combustion and Emissions

Session Code: ***PFL110***

Room 412 A ***Session Time:*** ***1:30 p.m.***

Separate sub-sessions cover zero-dimensional, one-dimensional, and quasi-dimensional models for simulation of SI and CI engines with respect to: engine breathing, boosting, and acoustics; SI combustion and emissions; CI combustion and emissions; fundamentals of engine thermodynamics; numerical modeling of gas dynamics; thermal management; mechanical and lubrication systems; system level models for controls; system level models for vehicle fuel economy and emissions predictions.

Organizers - *Michael Bybee, Gamma Technologies Inc.; Jan Macek, Czech Technical Univ.; Federico Millo, Politecnico di Torino; Christof Schernus, FEV Europe GmbH*

Chairpersons - *Navin Fogla, Gamma Technologies LLC*

Time	***Paper No.***	***Title***

1:30 p.m.	***2017-01-0511***	***Control-Oriented Modeling of Soot Emissions in Gasoline Partially Premixed Combustion with Pilot Injection*** *Tianhao Yang, Dalian University of Technology; Lianhao Yin, Gabriel Ingesson, Per Tunestal, Rolf Johansson, Lund University; Wuqiang Long, Dalian University of Technology*
2:00 p.m.	***2017-01-0512***	***Development of a Computationally Efficient Progress Variable Approach for a Direct Injection Stochastic Reactor Model*** *Andrea Matrisciano, Chalmers University of Technology; Tim Franken, Ford Motor Company; Cathleen Perlman, Anders Borg, Harry Lehtiniemi, LOGE AB; Fabian Mauss, Brandenburg University of Technology*
2:30 p.m.	***2017-01-0516***	***Advanced Predictive Diesel Combustion Simulation Using Turbulence Model and Stochastic Reactor Model*** *Tim Franken, Arnd Sommerhoff, Werner Willems, Ford Motor Company; Andrea Matrisciano, Chalmers University of Technology; Harry Lehtiniemi, Anders Borg, LOGE AB; Corinna Netzer, Fabian Mauss, Brandenburg University of Technology*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0517***	***Development and Validation of a Quasi-Dimensional Dual Fuel (Diesel â€' Natural Gas) Combustion Model*** *Ivan Taritas, Darko Kozarac, Momir Sjeric, University of Zagreb; Miguel Sierra Aznar, David Vuilleumier, UC Berkeley; Reinhard Tatschl, AVL LIST GmbH*
4:00 p.m.	***2017-01-0523***	***Phenomenological Autoignition Model for Diesel Sprays Using Reduced Chemical Kinetics and a Characteristic Scalar Dissipation Rate*** *Adam B. Dempsey, Scott B. Fiveland, Caterpillar Inc.; Scott L. Post, Lincoln Agritech Limited*
4:30 p.m.	***2017-01-0537***	***A Full-Cycle Multi-Zone Quasi-Dimensional Direct Injection Diesel Engine Model Based on a Conceptual Model Developed from Imaging Experiments*** *Murat Ates, Cummins Inc.; Ronald D. Matthews, Matthew J. Hall, The University of Texas at Austin*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Advanced Fuel Cell Vehicle Applications (Part 1 of 2)

Session Code: ***PFL720***

Room 412 B ***Session Time:*** ***8:00 a.m.***

This session covers fuel cell advances from vehicle manufacturers in the first stage of series production FCEVs. In addition, there are modeling studies and evaluation of PEM fuel cell cold start, analysis, turbo compressor and oxide supports.

Organizers - *Anita Chaudhari, Ford Motor Company; Jesse Schneider*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1186***	***Method to Enhance Fuel Cell Powertrain System Robustness by Reducing Cathode Potential during Start-Up Condition*** *Chunmei Wang, Shinichi Hirano, Ford Motor Company*
8:30 a.m.	***2017-01-1182***	***Numerical Models for PEMFC Cold Tart: A Review*** *Xin Guo, Xu Peng, Sichuan Xu, Tongji University*

9:00 a.m.	***2017-01-1189***	***Development of Fuel Cell System Control for Sub-Zero Ambient Conditions*** *Tsuyoshi Maruo, Masashi Toida, Tomohiro Ogawa, Toyota Motor Corporation; Yuji Ishikawa, Nippon Soken Inc.; Hiroyuki Imanishi, Nada Mitsuhiro, Yoshihiro Ikogi, Toyota Motor Corporation*
9:30 a.m.	***2017-01-1188***	***Synchrotron X-Ray Visualization and Simulation for Operating Fuel Cell Diffusion Layers*** *Daisuke Hayashi, Atsushi Ida, Shota Magome, Toyota Motor Corporation; Takahisa Suzuki, Satoshi Yamaguchi, TOYOTA Central R&D Labs., Inc.; Ryosuke Hori, Nippon Soken, Inc.*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1179***	***Study of Oxide Supports for PEFC Catalyst*** *Tatsuya Arai, Ozaki Takashi, Kazuki Amemiya, Tsuyoshi Takahashi, Toyota Motor Corporation*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Advanced Fuel Cell Vehicle Applications (Part 2 of 2)

Session Code: ***PFL720***

Room 412 B ***Session Time:*** ***1:30 p.m.***

This session covers fuel cell advances from vehicle manufacturers in the first stage of series production FCEVs.

In addition,modeling and demonstration of novel fuel cell vehicle concepts are will be shown as well as hydrogen infrastructure, hydrogen storage and hydrogen fueling will be presented.

Organizers - *Anita Chaudhari, Ford Motor Company; Jesse Schneider, BMW*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-1185***	***Hydrogen-Powered Fuel Cell Range Extender Vehicle â€“ Long Driving Range with Zero-Emissions*** *Patrick Salman, Eva WallnÃ¶fer-Ogris, Markus Sartory, Alexander Trattner, Manfred Klell, HyCentA Research GmbH; Helfried MÃ¼ller, Axel-Oscar Bernt, Michael Martin, MAGNA STEYR Engineering AG & Co KG; Knut Schiefer, Manfred Limbrunner, Proton Motor Fuel Cell GmbH; Johannes HÃ¶flinger, Peter Hofmann, IFA - Vienna University of Technology*
2:00 p.m.	***2017-01-1180***	***Highly Integrated Fuel Cell Analysis Infrastructure for Advanced Research Topics*** *Stefan BrandstÃ¤tter, Michael Striednig, David Aldrian, Alexander Trattner, Manfred Klell, HyCentA Research GmbH; Tomas Dehne, Christoph KÃ¼gele, Michael Paulweber, AVL List GmbH*
2:30 p.m.	***2017-01-1184***	***Development of New Hydrogen Fueling Method for Fuel Cell Motorcycle*** *Kiyoshi Handa, Shigehiro Yamaguchi, Kazuya Minowa, Honda R&D Co., Ltd.; Steven Mathison, Honda R & D Americas Inc.*
3:00 p.m.		***BREAK***

3:30 p.m.	***2017-01-1183***	***Advancements and Opportunities for On-Board 700 Bar Compressed Hydrogen Tanks in the Progression Towards the Commercialization of Fuel Cell Vehicles*** *Kenneth Johnson, Pacific Northwest National Laboratory; Michael J. Veenstra, Ford Motor Company; David Gotthold, Kevin Simmons, Kyle Alvine, Pacific Northwest National Laboratory; Bert Hobein, Daniel Houston, Ford Motor Company; Norman Newhouse, Brian Yeggy, Alex Vaipan, Hexagon Lincoln; Thomas Steinhausler, AOC, LLC; Anand Rau, Crosslink Technologies*
4:00 p.m.	***2017-01-1187***	***Development of Motorized Turbo Compressor for Clarity Fuel Cell*** *Tatsuya Sugawara, Takuma Kanazawa, Naoki Imai, Yu Tachibana, Honda R&D Co.,Ltd.*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Control System Design & Calibration (Part 1 of 4)

Session Code: ***PFL130***

Room 413 A ***Session Time:*** ***8:00 a.m.***

Separate sub-sessions cover powertrain control, calibration, and system-level optimization processes related to achieving stringent market fuel economy, emissions, performance, reliability, and quality demands. Topics include the control, calibration, and diagnostics of the engine, powertrain, and subsystems related to energy management in conventional and hybrid operation, considering the simultaneous optimization of hardware design parameters and control software calibration parameters.

Organizers - *Xuefei Chen, FCA US LLC; Scott Furry, MathWorks Inc.; Yichao Guo, Ford Motor Co., Ltd.; Kody G. Klindt, IAV Automotive Engineering Inc.; Feilong Liu, Delphi Corp.; Peter J. Maloney, MathWorks; Denise M. Rizzo, US Army TARDEC; Matti Vint, VALEO; Yue-Yun Wang, General Motors LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0598***	***Robust Model-Based Discrete Sliding Mode Control of an Automotive Electronic Throttle Body*** *Mohammad Reza Amini, Meysam Razmara, Mahdi Shahbakhti, Michigan Tech University*
8:30 a.m.	***2017-01-0586***	***An Application of a Model-Prediction-Based Reference Modification Algorithm to Engine Air Path Control*** *Hayato Shirai, Hayato Nakada, Akio Matsunaga, Hiroyuki Tominaga, Toyota Motor Corporation*
9:00 a.m.	***2017-01-0588***	***Adaptive Algorithm for Engine Air â€“ Fuel Ratio Control with Dual Fuel Injection Systems*** *Adithya P Reddy Ranga, Gopichandra Surnilla, Joseph Thomas, Ethan Sanborn, Mark Linenberg, Ford Motor Company*
9:30 a.m.	***2017-01-0593***	***Air-Fuel Ratio and Trapped Mass Estimation in Diesel Engines Using In-Cylinder Pressure*** *Ivan Arsie, Rocco Di Leo, Cesare Pianese, UniversitÃ di Salerno; Matteo De Cesare, Magneti Marelli Powertrain*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0610***	***Individual Cylinder Air-Fuel Ratio Control for Engines with Unevenly Spaced Firing Order*** *Nicolo Cavina, Francesco Ranuzzi, University of Bologna; Matteo De Cesare, Enrico Brugnoni, Magneti Marelli SpA - Div. Powertrain*

11:00 a.m.	***2017-01-0606***	***Modelling and Control of Engine Torque for Short-Circuit Flow and EGR Evacuation*** *Ashley Wiese, Ford Motor Company; Anna Stefanopoulou, University of Michigan; Julia Buckland, Amey Y. Karnik, Ford Motor Company*
11:30 a.m.	***2017-01-0608***	***A Nonlinear Model Predictive Control Strategy with a Disturbance Observer for Spark Ignition Engines with External EGR*** *Qilun Zhu, Robert Prucka, Clemson University; Michael Prucka, Hussein Dourra, FCA US LLC*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00577, and also individually. T purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Control System Design & Calibration (Part 2 of 4)

Session Code: ***PFL130***

Room 413 A ***Session Time:*** ***1:30 p.m.***

Separate sub-sessions cover powertrain control, calibration, and system-level optimization processes related to achieving stringent market fuel economy, emissions, performance, reliability, and quality demands. Topics include the control, calibration, and diagnostics of the engine, powertrain, and subsystems related to energy management in conventional and hybrid operation, considering the simultaneous optimization of hardware design parameters and control software calibration parameters.

Organizers - *Xuefei Chen, FCA US LLC; Scott Furry, MathWorks Inc.; Yichao Guo, Ford Motor Co., Ltd.; Kody G. Klindt, IAV Automotive Engineering Inc.; Feilong Liu, Delphi Corp.; Peter J. Maloney, MathWorks; Denise M. Rizzo, US Army TARDEC; Matti Vint, VALEO; Yue-Yun Wang, General Motors LLC*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0583***	***Accurate Cycle Predictions and Calibration Optimization Using a Two-Stage Global Dynamic Model*** *Farraen Mohd Azmin, Phil Mortimer, Justin Seabrook, Ricardo UK Ltd.*
2:00 p.m.	***2017-01-0591***	***Turbo Speed Estimation Using Fixed-Point Iteration*** *Andreas Thomasson, Xavier Llamas, Lars Eriksson, LinkÃ¶ping University*
2:30 p.m.	***2017-01-0587***	***Multi-Objective Optimization of Transient Air-Fuel Ratio Limitation of a Diesel Engine Using DoE Based Pareto-Optimal Approach*** *Cetin Gurel, Elif Ozmen, Metin Yilmaz, Didem Aydin, Kerem Koprubasi, Ford Motor Company*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0592***	***Investigation of Performance Differences and Control Synthesis for Servo-Controlled and Vacuum-Actuated Wastegates*** *Robin Holmbom, LinkÃ¶ping University; Bohan Liang, Volvo Car Corporation; Lars Eriksson, LinkÃ¶ping University*
4:00 p.m.	***2017-01-0584***	***A Predictive Energy Management Strategy Using a Rule-Based Mode Switch for Internal Combustion Engine (ICE) Vehicles*** *Haksu Kim, Jaewook Shin, Myoungho Sunwoo, Hanyang University*
4:30 p.m.	***2017-01-0600***	***MIMO Control for Optimising the Future Gasoline Powertrain - A Survey*** *Simon Petrovich, Kambiz Ebrahimi, Antonios Pezouvanis, Loughborough University*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Advanced Battery Technologies (Part 1 of 6)

Session Code: ***PFL730***

Room 413 B ***Session Time:*** ***8:00 a.m.***

The success of HEV's, PHEV's & EV's is highly dependent on their batteries. This session focuses on advanced battery technologies, including, but not limited to: advanced materials and cell chemistries, battery management systems and controls, modeling, testing, diagnosis and health monitoring, safety, reliability, durability, battery charging, battery economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, module, pack or vehicle levels.

Organizers - *Wayne Cai, General Motors; Yi Ding, RDECOM-TARDEC; James Miller, Argonne National Laboratory; Ramesh Rebba, General Motors LLC*

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	**Volume Expansion of Si-based Cells: Impact of Constraint Methods** *Hao Wen, Rachel Blaser, Mohan Karulkar, Andy Drews, Ford Motor Company*
8:30 a.m.	2017-01-1200	**High Power Cell for Mild and Strong Hybrid Applications Including Chevrolet Malibu** *Vijay Saharan, General Motors LLC; Kenji Nakai, Hitachi Automotive Systems Americas Inc.*
9:00 a.m.	ORAL ONLY	**Mathematical model to understand effects of cell temperature gradients on battery performance** *Rutooj D. Deshpande, Christian Shaffer, William Moore, Ford Motor Company*
9:30 a.m.	ORAL ONLY	**Progress in Solid State Battery Technology for EV Applications** *Venkat Anandan, Ford Motor Co., Ltd.*
10:00 a.m.		**BREAK**
10:30 a.m.	ORAL ONLY	**Synergistic effect between lithium bis(fluorosulfonyl) imide (LiFSI) and propylene carbonate (PC) in electrolyte for high performance LTO based lithium ion batteries** *Lan Zhang, Suojiang Zhang, IPE, Chinese Academy of Sciences; Zoe Zhou, Kent Snyder, Ted Miller, Ford Motor Company*
11:00 a.m.	ORAL ONLY	**Pre-Lithiation in Full Cells with Si-Based Anodes** *Rachel Blaser, Mohan Karulkar, Ford Motor Company*
11:30 a.m.	ORAL ONLY	**An Impedance Sweep Technique for Determining the Optimal SOC Range in Si Anodes** *Rachel Blaser, Mohan Karulkar, A Drews, Ford Motor Company*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Advanced Battery Technologies (Part 2 of 6)

Session Code: ***PFL730***

Room 413 B ***Session Time:*** ***1:30 p.m.***

The success of HEV's, PHEV's & EV's is highly dependent on their batteries. This session focuses on advanced battery technologies, including, but not limited to: advanced materials and cell chemistries, battery management systems and controls, modeling, testing, diagnosis and health monitoring, safety, reliability, durability, battery charging, battery economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, module, pack or vehicle levels.

Organizers - *Wayne Cai, General Motors; Yi Ding, RDECOM-TARDEC; James Miller, Argonne National Laboratory; Ramesh Rebba, General Motors LLC*

Time	Paper No.	Title

1:30 p.m.	***ORAL ONLY***	***Production xEV Battery Systems at Fordâ€' An Historical Overview*** *Bob Taenaka, Ford Motor Company*
2:00 p.m.	***ORAL ONLY***	***State of Overcharge:*** ***Lithium-ion Battery Abuse Response and Phenomena in the Realm Beyond 100% SOC in Automotive Applications*** *Kent Snyder, Zoe Zhou, Christopher Malencia, Omar Elsayed, Shannon Klaus, Ted Miller, Ford Motor Company*
2:30 p.m.	***ORAL ONLY***	***Evaluation of Metal Oxides as Anodes for Next Generation Batteries*** *Robert Kudla, Mohan Karulkar, William A. Paxton, A Drews, Ford Motor Company*
3:00 p.m.		***BREAK***
3:30 p.m.	***ORAL ONLY***	***The Importance of Scale-up Testing for Development of High Energy Si Anodes*** *Mohan Karulkar, Hao Wen, Robert Kudla, Rachel Blaser, A Drews, Ford Motor Company*
4:00 p.m.	***ORAL ONLY***	***Assessment of Lithium Metal Reactivity to Fluids*** *Mohan Karulkar, Venkat Anandan, Ford Motor Company*
4:30 p.m.	***ORAL ONLY***	***Measuring state-of-charge inhomogeneity in high-capacity lithium-ion cells during operation*** *William A. Paxton, Andy Drews, Ford Motor Company; John Okasinski, Jun-Sang Park, Argonne National Laboratory*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Fluid flow Measurement & Analysis

Session Code: ***PFL140***

Room 414 A ***Session Time:*** ***8:00 a.m.***

The focus of this session is the measurement and analysis of in-cylinder and port flows in research and production engines. Topics may including PIV, PTV, LDV, and fluorescent tracer measurements of velocity and turbulence characteristics and modeling analysis of engine flows.

Organizers - *Oivind Andersson, Lund University; Matthew J. Hall, Univ. of Texas-Austin; Benjamin Petersen, Ford Motor Company*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0617***	***Study of Air Flow Interaction with Pilot Injections in a Diesel Engine by Means of PIV Measurements*** *Jose M Garcia-Oliver, Antonio Garcia, Antonio Gil, Leonardo Pachano, Universitat Politecnica de Valencia*
8:30 a.m.	***2017-01-0618***	***Impact of Fuel Sprays on In-Cylinder Flow Length Scales in a Spark-Ignition Direct-Injection Engine*** *Hanyang Zhuang, Shanghai Jiao Tong University; Volker Sick, Hao Chen, The University of Michigan*
9:00 a.m.	***2017-01-0614***	***Three-Dimensional Three-Component Air Flow Visualization in a Steady-State Engine Flow Bench Using a Plenoptic Camera*** *Hao Chen, Volker Sick, University of Michigan*

9:30 a.m.	***2017-01-0613***	***Two-Point Spatial Velocity Correlations in the Near-Wall Region of a Reciprocating Internal Combustion Engine*** *James R. MacDonald, Claudia M. Fajardo, Western Michigan University; Mark Greene, David Reuss, Volker Sick, University of Michigan*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0615***	***Distortion Mapping Correction of In-Cylinder Flow Field Measurements through Optical Liner Using Gaussian Optics Model*** *Penghui Ge, Fengnian Zhao, David Hung, University of Michigan - SJTU Joint Institute; Hujie Pan, Min Xu, Shanghai Jiao Tong University*
11:00 a.m.	***2017-01-0612***	***Detecting Outliers in Crank Angle Resolved Engine Flow Field Datasets for Proper Orthogonal Decomposition Analysis*** *Li Shen, Kwee-Yan Teh, Penghui Ge, Yusheng Wang, David L.S. Hung, UM-SJTU JI, Shanghai Jiao Tong University*
11:30 a.m.	***2017-01-0616***	***Preliminary Investigation of Exhaust Pressure Waves in a Single Cylinder Diesel Engine and the Impacts on Aftertreatment Sprays*** *Zhenyi Yang, Shouvik Dev, Marko Jeftic, Christopher Aversa, Akshay Ravi, David Ting, Ming Zheng, University of Windsor*
12:00 p.m.	***2017-01-0619***	***Optical Engine Operation to Attain Piston Temperatures Representative of Metal Engine Conditions*** *Ravi Teja Vedula, Thomas Stuecken, Harold Schock, Michigan State University; Cody Squibb, Ken Hardman, FCA US LLC*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Engine Block, Cylinder Heads, Oil & Water Pumps, Intake & Exhaust Systems (Part 1 of 2)

Session Code: ***PFL580***

Room 414 B ***Session Time:*** ***8:00 a.m.***

This session describes the design, modeling and performance validation of cylinder heads, lubrication systems and pumps, coolant systems and pumps, intake manifolds, exhaust manifolds, and engine block structures.`

Organizers - *Sujan Dhar, Simerics Inc.; Dwight Doig, Cummins Inc.; Leonid Tartakovsky, Technion Israel Inst. of Technology*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1074***	***Cylinder Head Design Process to Improve High Cycle Fatigue Performance*** *Xingfu Chen, Todd Brewer, Cagri Sever, Eben Prabhu, Reda Adimi, Carlos Engler-Pinto, Ford Motor Company*
8:30 a.m.	***2017-01-1085***	***Field Risk Assessment Based on Cylinder Head Design Process to Improve High Cycle Fatigue Performance*** *Todd Brewer, Cagri Sever, Ruichen Jin, Michael Herr, Xingfu Chen, Reda Adimi, Ford Motor Company*
9:00 a.m.	***2017-01-1091***	***Cylinder Head Gasket Fretting/Scrub Mechanism Investigation and Analysis Procedure Developments*** *Todd Brewer, Xingfu Chen, Ford Motor Company*
9:30 a.m.	***2017-01-1086***	***Cylinder Head Thermo-Mechanical Fatigue Risk Assessment under Customer Usage*** *Cagri Sever, Todd Brewer, Scott Eeley, Xingfu Chen, Ruichen Jin, Emad Khalil, Michael Herr, Ford Motor Company*

10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1080***	***Finite Element Analysis of Cylinder Gasket under Cylinder Pressure and Structural Optimization of the Cylinder Gasket*** *Yanan Wei, Tongji University; Shuai Yang, CFD Consultants GmbH; Xiuyong Shi, Jiaqi Li, Xuewen Lu, Tongji University*
11:00 a.m.	***2017-01-1089***	***Development Of High Performance â€œPlug&Coolâ€ EGR Coolers For CV Applications*** *Jose Grande, Julio Abraham Carrera, Manuel Dieguez Sr, BorgWarner Emissions Systems*
11:30 a.m.	***2017-01-1090***	***Non-Linear Finite Element Analysis of Valve Seats and Valve Guides Assembly in Engine Cylinder Head*** *Praveen Kumar Tumu, KungHao Wang, Juhchin Yang, Selvakumar Palani, Balaji Srinivasan, Ford Motor Company*

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Engine Block, Cylinder Heads, Oil & Water Pumps, Intake & Exhaust Systems (Part 2 of 2)

Session Code: ***PFL580***

Room 414 B ***Session Time:*** ***1:30 p.m.***

This session describes the design, modeling and performance validation of cylinder heads, lubrication systems and pumps, coolant systems and pumps, intake manifolds, exhaust manifolds, and engine block structures.`

Organizers - *Sujan Dhar, Simerics Inc.; Dwight Doig, Cummins Inc.; Leonid Tartakovsky, Technion Israel Inst. of Technology*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-1077***	***First Plastic Diesel Fuel Filter using 100% Recycled Polymer: When Circular Economy Join Automotive Industry*** *Nicolas Arnault, SOGEFI; Nicolas Batailley, SOLVAY EP; Arnaud Maria, SOGEFI; Laurent Bechu, PSA*
2:00 p.m.	***2017-01-1082***	***Effect of Valvetrain Components Misalignment on Valve and Guide Interactions in Automotive Engines*** *Mohammed Yusuf Ali, Thomas Sanders, Mikhail A. Ejakov, Reda Adimi, Ford Motor Company; Alexander Boucke, Jochen Lang, Gunter Knoll, IST Engineering Company*
2:30 p.m.	***2017-01-1075***	***An Object-Oriented Approach to the Post-Processing of Cylinder Bore Distortion, Valve Seat Distortion, Valve Guide-to-Seat Misalignment and Cam Bore Misalignment*** *Wen Chen, Reda Adimi, Xingfu Chen, Todd Brewer, Ling Shi, Ford Motor Company*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-1087***	***Investigation of Scavenging Process for Steady-State Operation of a Linear Internal Combustion Engine-Linear Generator Integrated System*** *Pengfei Zang, Zhe Wang, Yu Fu, Chenle Sun, Tongji University*

4:00 p.m.	***2017-01-1088***	***Characterization of Crankcase Pressure Variation during the Engine Cycle of an Internal Combustion Engine*** *Katherine Randall, Ford Motor Company; Cody Bradford, Michigan State University; Jeremy Ross, Jeremy Church, Nolan Dickey, Adam Christian, Matthew Dunn, Ford Motor Company*
4:30 p.m.	***2017-01-1078***	***Effect of Replacement of Butterfly Throttle Body by Barrel Throttle Body on Mass Flow Rate using CFD*** *Walid Ashraf, Sherif Khedr, Aya Diab, Hashim Elzaabalawy, Ain Shams University*

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Driveline Components/Subsystems (Part 1 of 2)

Session Code: ***PFL670***

Room 415 A ***Session Time:*** ***9:00 a.m.***

This session includes papers on the full array of transmission and driveline related components.

Organizers - *Patrick Robert Darmstadt, Boeing Co.; Yashodhan V. Joshi, Cummins Inc.; Chunhao Lee, General Motors LLC; Brian Schneidewind, Toyota Technical Center USA Inc.*

Time	***Paper No.***	***Title***
9:00 a.m.	***2017-01-1129***	***Impact of Organic Sulfur on Frictional Performance*** *Kayoko Kanda, Aisin Chemical Co., Ltd.*
9:30 a.m.	***2017-01-1132***	***Development of an Analytical Model for Prediction of Drag Torque Characteristics of Disengaged Wet Clutches in High Speed Region*** *Shahjada A. Pahlovy, Syeda Mahmud, Masamitsu KUBOTA, Makoto Ogawa, Norio Takakura, Dynax Corporation*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1127***	***Two-Phase MRF Model for Wet Clutch Drag Simulation*** *Pengchuan Wang, Nikolaos Katopodes, University of Michigan; Yuji Fujii, Ford Motor Company*
11:00 a.m.	***2017-01-1133***	***Development and Challenges of Electrically Selectable One-Way Clutches*** *Norman J. Bird, Raunak Bindra, Jacob Klaser, Ford Motor Company*

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Driveline Components/Subsystems (Part 2 of 2)

Session Code: ***PFL670***

Room 415 A ***Session Time:*** ***1:30 p.m.***

This session includes papers on the full array of transmission and driveline related components.

Organizers - *Patrick Robert Darmstadt, Boeing Co.; Yashodhan V. Joshi, Cummins Inc.; Chunhao Lee, General Motors LLC; Brian Schneidewind, Toyota Technical Center USA Inc.*

Time	***Paper No.***	***Title***

1:30 p.m.	***2017-01-1135***	***Transmission Output Chain Spin Loss Study*** *Sen Zhou, General Motors LLC; Bryan Williams, Southwest Research Institute*
2:00 p.m.	***2017-01-1134***	***Influences of a Parallel Axis Gear on Pinion Load Distribution in a Planetary System*** *Taechung Kim, Jaret Villarreal, Luke Rippelmeyer, Toyota Motor North America*
2:30 p.m.	***2017-01-1131***	***Defining In-Vehicle Location and Functional Attributes of a â€˜Button-Style Electronic Automatic Transmission Shifterâ€™ Using DFSS Methodology with Customer Clinic Approach*** *Keith Gilbert, Srini Mandadapu, Christopher Cindric, General Motors LLC*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-1130***	***Toyotaâ€™s New Driveline for FR Passenger Vehicles*** *Shinya Takamatsu, Nobuharu Imai, Koji Tsurumura, Seiji Yamashita, Hiroaki Tashiro, Toyota Motor Corporation*
4:00 p.m.	***ORAL ONLY***	***Rethinking Drive Axles*** *John Hibbler, AAM (American Axle & Mfg Inc)*

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Fuel and Additive Effects on Engine Systems (Part 1 of 3)

Session Code: ***PFL310***

Room 415 B ***Session Time:*** ***8:00 a.m.***

Topics include the effects of fuel and additives on deposit formation, intake system cleanliness, friction, wear, corrosion, and elastomer compatibility. Also covered are effects of fuel specification on drivability, on evaporative emissions, and on the relationship between emissions and drive cycle.

Organizers - *Julie Galante-Fox, Afton Chemical Corp.; Barbara Goodrich, John Deere Product Engineering Center; Paul Richards; Phoi Truong, PACCAR Inc.*

Chairpersons - *Julie Galante-Fox, Afton Chemical Corp*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0798***	***A Chemical and Morphological Study of Diesel Injector Nozzle Deposits - Insights into their Formation and Growth Mechanisms*** *Nicholas J. Rounthwaite, Rod Williams, Shell Global Solutions (UK); Catriona McGivery, Jun Jiang, Finn Giulliani, Ben Britton, Imperial College*
8:30 a.m.	***2017-01-0803***	***A Study of Diesel Fuel Injector Deposit Effects on Power and Fuel Economy Performance*** *Christiane Behrendt, Shell Global Solutions (Deutschland)GmbH; Alastair Smith, Shell Global Solutions UK*
9:00 a.m.	***2017-01-0807***	***The Effect of Near-Zero Aromatic Fuels on Internal Diesel Injector Deposit Test Methods*** *Stefan de Goede, Sasol Technology (Pty), Ltd.; Robert Barbour, Lubrizol Ltd.; Adrian Velaers, Sasol Shared Services a Division of SGS; Brian Sword, Daniel Burton, Lubrizol Ltd.; Konrad Mokheseng*

9:30 a.m.	***2017-01-0808***	***Injector Fouling and Its Impact on Engine Emissions and Spray Characteristics in Gasoline Direct Injection Engines*** *Sebastian Henkel, Yannis Hardalupas, Alexander Taylor, Imperial College London; Christopher Conifer, Roger Cracknell, Tor Kit Goh, Shell Global Solutions; Paul-Benjamin Reinicke, Marc Sens, Michael RieÃŸ, IAV GmbH, Germany*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0806***	***Accumulation Mechanism of Gasoline EGR Deposit*** *Genki Kikuchi, Masashi Miyagawa, Yoshiaki Yamamoto, Naruhiko Inayoshi, DENSO Corporation*
11:00 a.m.	***2017-01-0804***	***Evaluation of Anti-Knock Quality of Dicyclopentadiene-Gasoline Blends*** *Mohannad Al-Khodaier, Vijai Shankar Bhavani Shankar, Muhammad Waqas, Nimal Naser, Mani Sarathy, Bengt Johansson, King Abdullah University of Science and Technology*
11:30 a.m.	***2017-01-0805***	***A Study on the Effects of Cetane Number on the Energy Balance between Differently Sized Engines*** *Jue Li, Texas A&M University; Tushar K. Bera, Michael Parkes, Shell Global Solutions; Timothy J. Jacobs, Texas A&M University*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Fuel and Additive Effects on Engine Systems (Part 2 of 3)

Session Code: ***PFL310***

Room 415 B ***Session Time:*** ***1:30 p.m.***

Topics include the effects of fuel and additives on deposit formation, intake system cleanliness, friction, wear, corrosion, and elastomer compatibility. Also covered are effects of fuel specification on drivability, on evaporative emissions, and on the relationship between emissions and drive cycle.

Organizers - *Julie Galante-Fox, Afton Chemical Corp.; Barbara Goodrich, John Deere Product Engineering Center; Paul Richards; Phoi Truong, PACCAR Inc.*

Chairpersons - *Julie Galante-Fox, Afton Chemical Corp*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0802***	***Compatibility of Fuel System Elastomers with Bio-Blendstock Fuel Candidates Using Hansen Solubility Analysis*** *Michael D. Kass, Brian H. West, Oak Ridge National Laboratory*
2:00 p.m.	***ORAL ONLY***	***Factors affecting filterability of diesel fuels*** *David Daniels, Alexander Belly, Andrew McKnight, Innospec Fuel Specialities; Eric Payne, Innospec Fuel Specialties*
2:30 p.m.	***2017-01-0809***	***Soy Biodiesel Oxidation at Vehicle Fuel System Temperature: Influence of Aged Fuel on Fresh Fuel Degradation to Simulate Refueling*** *James E. Anderson, Travis R. Collings, Sherry A. Mueller, James C. Ball, Timothy J. Wallington, Ford Motor Company*
3:00 p.m.		***BREAK***

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

On-board Measurement and Control

Session Code: ***PFL425***

Room 420 A ***Session Time:*** ***10:30 a.m.***

This technical session will focus on internal combustion engine emissions on board measurement and control. Papers and presentations will cover topics that discuss varying methods of emissions data collection and control during operation of vehicles and engines. Topics will also include various advanced analysis techniques to determine emissions levels and reduce emissions under in-use operations.

Organizers - *Shouxian Ren, General Motors; Hui Xu, Cummins Inc.*

Time	Paper No.	Title
10:30 a.m.	***2017-01-0949***	***Development of High Accuracy Rear A/F Sensor*** *Makoto Ito, Mitsuru Sakimoto, Zhenzhou Su, DENSO Corporation; Go Hayashita, Keiichiro Aoki, Toyota Motor Corp.*
11:00 a.m.	***2017-01-0950***	***On-Board Particulate Filter Failure Prevention and Failure Diagnostics using Radio Frequency Sensing*** *Alexander Sappok, Paul Ragaller, Andrew Herman, CTS Corporation; Leslie Bromberg, Massachusetts Institute of Technology; Vitaly Prikhodko, James Parks, John Storey, Oak Ridge National Laboratory*
11:30 a.m.	***2017-01-0951***	***Development and Application of a Virtual NOx Sensor for Robust Heavy Duty Diesel Engine Emission Control*** *Paul Mentink, Xander Seykens, Daniel Escobar Valdivieso, TNO Automotive*
12:30 p.m.	***2017-01-0952***	***Evaluation of Non-Contiguous PM Measurements with a Resistive Particulate Matter Sensor*** *Michael B. Hopka, David Bilby, Michiel Van Nieuwstadt, Ford Motor Company*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Emission Control Modeling (Part 1 of 4)

Session Code: ***PFL430***

Room 420 A ***Session Time:*** ***2:00 p.m.***

This technical session addresses exhaust aftertreatment system models, as well as their validation and application. Technologies encompassed include DOC, HC Trap, DPF, GPF, LNT, TWC, SCR, SCRF, ammonia oxidation catalysts, hybrid or combined catalysts, urea-water solution spray dynamics, and mixture non-uniformity. Modeling aspects range from fundamental 3-D models of individual components to system level simulation and optimization.

Organizers - *Christopher Depcik, Univ. of Kansas; Maruthi Devarakonda, General Electric Company; Thomas McKinley, Cummins Inc.; Vincenzo Mulone, Univ. Of Roma Tor Vergata; Achuth Munnannur, Cummins Inc.; Balaji Sukumar, Johnson Matthey ECT*

Chairpersons - *Susan E. Brasmer, Cummins Inc.*

Time	Paper No.	Title
2:00 p.m.	***2017-01-0960***	***Model-based Control of a Three-way Catalytic Converter Based on the Estimated Oxygen Storage Level of the Catalyst*** *Pankaj Kumar, Imad Makki, Ford Motor Company*
2:30 p.m.	***2017-01-0975***	***Three-way Catalyst Diagnostics and Prognostics Based on Support Vector Machines*** *Pankaj Kumar, Imad Makki, Ford Motor Company*

3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0961***	***Reducing Catalyst Zone Flow for Robust Emissions Performance in the Presence of Engine Air Fuel Ratio Imbalance*** *Ray Host, Paul Ranspach, Bruce Anderson, Michael Collareno, George Tapos, Cornelius Henderson, Ford Motor Company*
4:00 p.m.	***2017-01-0962***	***Lean Breakthrough Phenomena Analysis for TWC OBD on a Natural Gas Engine using a Dual-Site Dynamic Oxygen Storage Capacity Model*** *Jian Gong, Di Wang, Avra Brahma, Junhui Li, Neal Currier, Aleksey Yezerets, Cummins Inc.; Pingen Chen, Tennessee Technological University*
4:30 p.m.	***2017-01-0966***	***Simulation of a three-way catalyst using transient single and multi-channel models*** *Jana Aslanjan, Brandenburg University of Technology; Christian Klauer, Cathleen Perlman, Vivien GÃ¼nther, LOGE AB; Fabian Mauss, Brandenburg University of Technology*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Exhaust Emissions Control - New Developments (Part 1 of 2)

Session Code: ***PFL410***

Room 420 B ***Session Time:*** ***9:00 a.m.***

Presentations are invited on technology developments and integration of these technologies into new emission control systems. Topics include the integration of various diesel particulate matter (PM) and diesel Nitrogen Oxide (NOx) reduction technologies plus analogous technologies for the growing population of direct injection gasoline engines. Novel developments in sensors and control systems will also be considered.

Organizers - *Homayoun Ahari, FCA US LLC; Kenneth S. Price, Umicore Autocat USA Inc.; Ron Silver, Caterpillar Inc.; Roger A. Van Sickle, FEV Inc.*

Time	***Paper No.***	***Title***
9:00 a.m.	***2017-01-0907***	***Review of Vehicle Efficiency and Emissions*** *Timothy Johnson, Ameya Joshi, Corning Inc.*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0911***	***Aftertreatment Architecture and Control Methodologies for Future Light Duty Diesel Emission Regulations*** *Krishna Chilumukuru, Aniket Gupta, Michael Ruth, Michael Cunningham, Govindarajan Kothandaraman, Cummins Inc.; Lasitha Cumaranatunge, Howard Hess, Johnson Matthey Inc.*
11:00 a.m.	***ORAL ONLY***	***The Effect of Fuel Sulfur Content on Ammonia, Aldehyde and Regulated Emissions Emitted from a Euro III Motorcycle (SAE Brasil Best Paper #2016-36-0158)*** *Luiz Carlos Daemme, Renato Arruda Penteado, Institutos LACTEC â€“ Brazil; Fatima Zotin, SÃ©rgio M. Correa, State University of Rio de Janeiro â€“ UERJ Brazil; Marcelo Errera, Federal University of ParanÃ¡ â€“ UFPR Brazil; Andre Forcetto, CETESB â€“ Environmental Company of SÃ£o Paulo State, Brazil*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Exhaust Emissions Control - New Developments (Part 2 of 2)

Session Code: ***PFL410***

Room 420 B ***Session Time:*** ***1:30 p.m.***

Presentations are invited on technology developments and integration of these technologies into new emission control systems. Topics include the integration of various diesel particulate matter (PM) and diesel Nitrogen Oxide (NOx) reduction technologies plus analogous technologies for the growing population of direct injection gasoline engines. Novel developments in sensors and control systems will also be considered.

Organizers - *Homayoun Ahari, FCA US LLC; Kenneth S. Price, Umicore Autocat USA Inc.; Ron Silver, Caterpillar Inc.; Roger A. Van Sickle, FEV Inc.*

Time	Paper No.	Title
1:30 p.m.	***2017-01-0909***	***Particle Number Reduction in Automotive Exhausts using Acoustic Metamaterials*** *Zhe Zhang, KTH Royal Institute of Technology, CCGEx; Mats Abom, KTH Royal Institute of Technology; Hans Boden, KTH CICERO; Mikael Karlsson, KTH CCGEx*
2:00 p.m.	***2017-01-0910***	***Reaction Mechanism Study of the Di-Air System and Selectivity and Reactivity of NO Reduction in Excess O₂*** *Michiel Makkee, Yixiao Wang, Delft University of Technology*
2:30 p.m.	***2017-01-0908***	***Conversion of Exhaust Gases from Dual-Fuel (Natural Gas-Diesel) Engine under Ni-Co-Cu/ZSM-5 Catalysts*** *Fanxu Meng, Asanga Wijesinghe, John Colvin, Carolyn LaFleur, Richard Haut, Houston Advanced Research Center*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Emissions Measurement and Testing (Part 1 of 3)

Session Code: ***PFL440***

Room 430 B ***Session Time:*** ***10:30 a.m.***

Sub-sessions cover emissions measuring techniques and testing regimes. This includes new analysis techniques and the novel application of existing techniques, the comparison of existing and proposed testing regimes with real world experience, including modeling.

Organizers - *Mike Braisher, Jaguar Land Rover; Praveen Chavannavar, General Motors LLC; Scott Allen Drennan; Allen B. Duncan, US EPA; Leslie Hill, Horiba Automotive Test Systems Corp.; Mahmoud K. Yassine, FCA US LLC*

Time	Paper No.	Title
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0982***	***Determining Three-way Catalyst Age using differential Lambda Signal Response*** *Dhruvang Rathod, Clemson University; Mark A. Hoffman, Clemson-ICAR; Simona Onori, Clemson University*
11:00 a.m.	***2017-01-0983***	***Alternative Particle Number Filtration Performance Test Method*** *Masaaki Ito, Frank Katsube, Yasuhiko Hamada, Hiroaki Ishikawa, NGK Insulators, Ltd.; Tsuyoshi Asako, NGK Automotive Ceramics, USA, Inc.*

11:30 a.m.	***2017-01-0984***	***Chassis Dynamometer and On-Road Evaluations of Emissions from a Diesel-Electric Hybrid Bus*** *Wenran Geng, Diming Lou, Ning Xu, Piqiang Tan, Zhiyuan Hu, Tongji University*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Emissions Measurement and Testing (Part 2 of 3)

Session Code: ***PFL440***

Room 430 B ***Session Time:*** ***1:30 p.m.***

Sub-sessions cover emissions measuring techniques and testing regimes. This includes new analysis techniques and the novel application of existing techniques, the comparison of existing and proposed testing regimes with real world experience, including modeling.

Organizers - *Mike Braisher, Jaguar Land Rover; Praveen Chavannavar, General Motors LLC; Scott Allen Drennan; Allen B. Duncan, US EPA; Leslie Hill, Horiba Automotive Test Systems Corp.; Mahmoud K. Yassine, FCA US LLC*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0989***	***Ultra-Trace Real Time VOC Measurements by SIFT-MS for VIAQ*** *Jennifer H. Zhu, Ford Motor Company; Christopher Nones, Yan Li, Daniel Milligan, Barry Prince, Syft Technologies; Mark Polster, Mark Dearth, Ford Motor Company*
2:00 p.m.	***2017-01-0996***	***Brake Particle Emission Measurements - Testing Method and Results*** *Sebastian Gramstat, AndrÃ©Cserhati, Audi AG; Matthias Schroeder, Horiba Automotive Test Systems Corp.; Dmytro Lugovyy, Horiba Europe GmbH*
2:30 p.m.	***2017-01-0997***	***Comparison of Data Analysis Methods for European Real Driving Emissions Regulation*** *Roberto Aliandro Varella, Universitiy of Lisbon - IST; GonÃ§alo Duarte, Patricia Baptista, IN+ - IST; Luis Sousa, Universitiy of Lisbon - IST; Pablo Mendoza Villafuerte, CNH Industrial*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0992***	***Comparison and Optimization of Fourier Transform Infrared Spectroscopy and Gas Chromatography-Mass Spectroscopy for Speciating Unburned Hydrocarbons from Diesel Low Temperature Combustion*** *Dereck Dasrath, University of Minnesota; Richard Frazee, AVL Test Systems Inc.; Jeffrey Hwang, William Northrop, University of Minnesota*
4:00 p.m.	***2017-01-0994***	***Investigation of Ultrasonic Flow Measurement for CVS Dilution Air Volume*** *Tim Nevius, Dario Rauker, Horiba Instruments Inc.; Masanobu Akita, Yoshinori Otsuki, Horiba Ltd.; Scott Porter, Michael Akard, Horiba Instruments Inc.*
4:30 p.m.	***2017-01-0995***	***Influence of Exhaust Gas Composition on Measured Total and Exhaust Flow Using a CVS with Critical Flow Venturi and Smooth Approach Orifice*** *Olle Berg, Lars-Gunnar Simonson, Volvo Car Group*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Tuesday, April 4

Opening Ceremony and Keynote Speaker: The Future of Autonomous Vehicle Technologies

Session Code: ***KEY101***

Room Grand Riverview Ballroom B ***Session Time:*** ***8:00 a.m.***

Time	*Paper No.*	*Title*
	ORAL ONLY	***Learn more about the Speaker*** *There is a confluence of technologies coming together regarding SAE Level 4 Autonomous Vehicles. Ford has been actively engaged in Research & Development on SAE Level 4 technologies for more than decade and is moving the technology forward into advanced engineering and production stages. Autonomous vehicles alone will not enable mobility of the future, these vehicles will need to be coupled with high tech Transportation and Vehicle Management Services to truly enable new mobility paradigms that together offer the societal and economic benefits of accessible transportation for all. An overview of the next generation development Autonomous Vehicle Platform and Virtual Driver System will be discussed as well as Fordâ€™s view on how to implement the technology.* *Ken Washington, Ford Motor Company*

Tuesday, April 4

Leadership Summit Tuesday

Session Code: ***LS100***

Room The Exchange ***Session Time:*** ***9:15 a.m.***

Time	*Paper No.*	*Title*
9:15 a.m.	***ORAL ONLY***	***Executive Interview*** *Executives interview regarding the insertion of technology and disruption in the marketplace.* * Interviewee: Kim Pittel, Ford Motor Company* * Interviewer: Carla Bailo, The Ohio State* *Meet the Participants*
10:15 a.m.	***ORAL ONLY***	***Roundtable: Establishing a Culture of Innovation*** *Thought leaders share how they have gone about establishing a corporate culture of innovation within their respective organizations. How are their approaches similar and differ amongst each other as well as new thought leaders entering the automotive industry?* ***Moderators -*** *Paul Mascarenas, FISITA* ***Panelists -*** *Lisa Bahash, Jabil Inc.; Viv Goldstein, GE; James Patrick Holland, Ford Motor Company; Swamy Kotagiri, Magna International Inc.; Michael Weinert, Deere & Company;* *Meet the Panel*
11:30 a.m.	***ORAL ONLY***	***Contemporary Panel: Internet of Things (IoT) and Mobility*** ***Moderators -*** *Robert Mince, Ford Motor Company* ***Panelists -*** *Michael Blanck, Cisco; Elliot D. Garbus, Intel Corp.; Bret Greenstein, IBM Corporation; Nigel Upton, Hewlett-Packard Co.;* *Meet the Panel*

Tuesday, April 4

Tech Hub Tuesday Afternoon

Session Code: ***TH100***

Room The Exchange ***Session Time:*** ***1:00 p.m.***

Time	*Paper No.*	*Title*
1:00 p.m.	***ORAL ONLY***	***The Divides (and Potential Bridges) Between Racing, Modern Technology, and People.*** *Racing has always been about human/machine interactions. A driver manipulates a machine around a track at the ragged edge and engineers adjust the car to make it as fast and reliable as possible. Yet different types of racing involve different levels of technology integration. NASCAR, which has its roots in the â€œrace on Sunday, sell on Mondayâ€ mentality, presents an interesting balance of maintaining the integrity of the sport and making the sport as technologically advanced as possible. In discussing this, we must ask, how does the evolving car culture in the United States influence industry developments? Can NASCAR learn from the broader automotive industry, and vice versa? What do engineers have to adapt to now that they may not have before?* *Julia Landauer, NASCAR Driver*
1:30 p.m.	***ORAL ONLY***	***Lessons Learned in an Electric Vehicle Race Around the World - 80eDays*** *In summer 2016 a group of Electric Vehicle enthusiasts raced around the globe, recharging with electric power only. We covered 289,662 km (180,026 miles) and crossed Europe, North America, and Asia. Our goal of circling the earth electrically in 80 days was achieved.* *Don Christian, Divergent 3D*
2:00 p.m.		***BREAK***
2:15 p.m.	***ORAL ONLY***	***Autonomous Driving, Redefined*** *Introduce the turn-key solution of Baidu iV BU for autonomous driving, the outstanding progress of technology and production, and the further direction to target our efforts* *Weihao Gu, Baidu*
2:45 p.m.	***ORAL ONLY***	***Is IoT the IoE for Automobiles?*** *The Internet of Things (IoT) is infiltrating every industry from manufacturing to hairbrushes and does not look like slowing down soon. Whilst IoT is attracting massive investment, few volume deployments have been witnessed with real success. Dr David Pugh, IoT analyst with research firm IDTechEx will discuss how will the innovations unlocking our smart homes and cities will have a potentially paradigm shifting impact the automotive industry and how a useful market is emerging from the confusion.* *David Pugh, IDTechEx*
3:15 p.m.	***ORAL ONLY***	***Self-Driving Cars: The Result of Secure Transformative Innovation*** *It is widely believed that autonomous vehicles will transform how we live, work, and, of course, commute. Over the next decade, pilot deployments of safe and climate smart autonomous vehicles are expected to generate enriched, faster, and cleaner transportation networks. However, the introduction of connected cars and the â€œInternet of Thingsâ€ creates a new set of risks, new security requirements, and new costs. As the cyber ecosystem becomes more complex, the automotive industry must balance the promise of increasingly feature-rich communications with the realization that more hackers will be motivated to develop attacks and exploitation tools.* *Pete Tseronis, Dots and Bridges*

3:45 p.m.		***BREAK***
4:00 p.m.	***ORAL ONLY***	***Creating the Future - Electric, Smart and Connected*** *The future of transportation is in a process of disruption. Cars are becoming profoundly different to adapt to new customer wants and to leverage new technologies. Quickly emerging are new ownership models, vehicle use cases, new sensing and controls, new propulsion choices, and 5g is on the way. In the future, cars and the business of transportation will be different from what they are today. If you were creating a car company, with no legacy to stand on or to hold you back, what choices would you make? Letâ€™s explore the possibilities.* *Peter Savagian, Faraday Future*
4:30 p.m.	***ORAL ONLY***	***Is Mooreâ€™s Law Dead or on Life Support?*** *Hans Stork, ON Semiconductor*

Tuesday, April 4

SAE WCX17 Women's Reception

Session Code: ***WP100***

Room The Exchange ***Session Time:*** ***5:00 p.m.***

Structured Networking and Reception, Sponsored by Denso

Tuesday, April 4

Knowledge Bar - Tuesday

Session Code: ***KB100***

Room The Knowledge Bar ***Session Time:*** ***2:00 p.m.***

Time	***Paper No.***	***Title***
3:00 p.m.	***ORAL ONLY***	***Cybersecurity for Embedded and Infrastructure*** *Andre Weimerskirch, Lear Corporation*
3:30 p.m.	***ORAL ONLY***	***SAE J3005 Permanently or Semi-Permanently Installed Diagnostic Communication Devices*** *Mark Zachos, DG Technologies*
4:00 p.m.	***ORAL ONLY***	***SAE J2945/1 TM On-Board System Requirements for V2V Safety Communications*** *Sue Bai, Honda*
4:30 p.m.	***ORAL ONLY***	***High Fidelity Virtual Platform Technologies: Reducing Risk through Accelerated Software Development*** *Paolo Giusto, General Motors LLC*
5:00 p.m.	***ORAL ONLY***	***Durability Design for Lightweight Structures*** *Yung-Li Lee, FCA US LLC*

Tuesday, April 4

Learning Lab - Tuesday

Session Code: ***LL100***

Room The Learning Lab ***Session Time: ALL DAY***

Time	***Paper No.***	***Title***
11:00 a.m.	***ORAL ONLY***	***Why the All-New 2018 Honda Odyssey Drives So Well*** *Tom Sladek, Honda Motor Company; Nicholas H. Goldsberry, Keith E. Malarik, Honda R & D Americas Inc.*
1:00 p.m.	***ORAL ONLY***	***9th Annual Global Automotive & Mobility Innovation Challenge (GAMICâ¸¢)*** *Automotive and Mobility solutions from around the globe will be center-stage at the 9th Annual GAMIC. Presented by SAE International and MI Innovation Alliance, Finals will be on the WCX show floor, with 13 top early-stage transportation and mobility solution providers from three countries and six states seeking over $300,000 in commercialization assistance and cash.* *GAMICâ€™s goals â€“ Bring new technologies to the forefront; Accelerate commercialization; and help forge new partnerships and collaborations for growth.* *Finalists will compete in four categories For more information see: www.GAMICevent.org * *1:00 Welcome â€“ David Stout * *1:05 Perspectives on Mobility Innovation * *Dr. Samit Ghosh, President of P3 North America * *1:20 Finalist Presentations I * *â€¢ Acerta Systems â€“ Greta Cutulenco * *â€¢ Barnard Acoustics â€“ Dr. Andrew Barnard * *â€¢ Clingfish Products â€“ Tasneen Bowe * *â€¢ ConnectMyEV â€“ Satyajit Patwardhan * *â€¢ CORA CyberSecurity â€“ Joseph Latouf * *â€¢ DataDriven â€“ Josh Siegel * *â€¢ DIYauto.com â€“ Steve Balistreri * *3:00 Topic TBD * *Keith Wilson SAE International * *3:10 Finalist Presentations II * *â€¢ eCalCharge â€“ Caroline LeFloch * *â€¢ FenSens â€“ Andy Karuza * *â€¢ PlasmaStream Technologies â€“ Jason Pottinger * *â€¢ SPLT â€“ Yale Zhang * *â€¢ Trillium â€“ David M. Uze * *â€¢ VeloMetro Mobility â€“ Kody Baker, P. Eng * *4:35 One Start-up: Commercialization Success Story * *Patrick Thompson CoorsTek Sensors * *4:50 Winners announced * *GAMIC Finalists*

Wednesday, April 5

Human Factors in Driver Vision and Lighting

Session Code: ***SS301***

Room 140 C ***Session Time: 8:00 a.m.***

Visual perception continues to be a critical aspect of overall driver performance. This session offers presentations highlighting new developments designed to provide better support for driver rearward vision, better understanding of how to measure light and its effects on driversâ€™eyes, and better understanding of how drivers accomplish the visually difficult task of negotiating intersections.

Organizers - *Michael J. Flannagan, Univ. of Michigan - Ann Arbor; Jianzhong Jiao, JZJ Consulting*

Time	Paper No.	Title
8:00 a.m.	**2017-01-1364**	***Vehicle Visibility Analysis in Static Conditions***
		Kashif Ali, Vikas Kumar, Virat Kalra, Amity University Noida
8:30 a.m.	**2017-01-1365**	***Self-Certification Requirements for Adaptive Driving Beam Headlamps***
		Michael Larsen, General Motors LLC
9:00 a.m.	**2017-01-1368**	***A Method for Digital Video Camera Calibration for Luminance Estimation***
		Jeffrey Aaron Suway, Biomechanical Research & Testing, LLC; Steven Suway
9:30 a.m.		***BREAK***
10:00 a.m.	**2017-01-1366**	***Comparing A Timed Exposure Methodology to the Nighttime Recognition Responses from SHRP-2 Naturalistic Drivers***
		Jeffrey Muttart, Swaroop Dinakar, Crash Safety Research Center, LLC; Jeffrey Suway, Biomechanical Research and Testing LLC; Michael Kuzel, 4M Safety; Timothy Maloney, Crash Safety Research Center, LLC; Wayne Biever, Toby Terpstra, Tilo Voitel, Kineticorp LLC; David Cavanaugh, Northwest Forensic Crash Reconstruction; T.J. Harms, City of Boise Police
10:30 a.m.	**2017-01-1370**	***A Fixed-quantity Indicator to Replace Display Annoyance in an Indirect Field of Vision***
		Hiroyuki Hara, Masaaki Kawauchi, Masayuki Katayama, Noriyuki Iwamori, DENSO Corporation
11:00 a.m.	**2017-01-1369**	***Development of a Robust Database for Measuring Human Gaze Behavior and Performance during Naturalistic Driving***
		Abtine Tavassoli, Sam Perlmutter, Dung Bui, James Todd, Laurene Milan, David Krauss, Exponent, Inc.

Planned by Human Factors Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Automotive Lighting Technology

Session Code: ***SS300***

Room 140 C ***Session Time:*** ***1:00 p.m.***

These papers highlight the interaction of driver vision - which is itself characterized by complexity, flexibility, and high levels of performanceâ€"with ever more sophisticated vision technologies to support driver vision. In particular, LED technology continued to advance in the past year, leading to broader lighting applications. Topics covered include lighting design strategy, lighting thermal management, driver fields of view, and characteristics of camera/display systems.

Organizers - *Joseph D. Jaklic, Osram Sylvania Inc.; Jianzhong Jiao*

Time	Paper No.	Title
1:00 p.m.	**2017-01-1361**	***High Performance LED Bi-function Module for Universal HID Replacement***
		Huan-Ping Chiu, Gerald Uhlenberg, Alex Wang, Jung Hsien Yen, TQ Optoelectronics Co., Ltd
1:30 p.m.	**2017-01-1356**	***How to Define Headlamp Light Performance ?***
		Rainer Neumann, Varroc Lighting Systems GmbH

2:00 p.m.	***2017-01-1360***	***Investigating the Influence of Headlight Glare and Aim on Risk-Related Driving Behavior*** *John D. Bullough, Rensselaer Polytechnic Institute*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1359***	***Influence Parameters on Headlamp Performance in Rating Systems and Reality*** *Michael Hamm, Audi AG*
3:30 p.m.	***2017-01-1358***	***A Rear-View Side Mirror with Exterior Lens to Improve Field of View and Aerodynamics of Automobiles*** *Hyunbin Park, Yonsei University, VMI Ltd.*

Planned by Human Factors Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Human Factors in Driving and Automotive Telematics (Part 1 of 2)

Session Code: ***SS302***

Room 140 D ***Session Time:*** ***8:00 a.m.***

As information and entertainment to and from the vehicle (Telematics) become more prolific it is critical to increase our understanding of how the driver understands and uses Telematics functions. Equally critical is how those functions impact the driver. This session will address those issues.

Organizers - *Kristin Kolodge, JD Power And Associates; Daniel J. Selke, Mercedes-Benz USA LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1384***	***Predicting Relative Crash Risk from the Attentional Effects of the Cognitive Demand of Visual-Manual Secondary Tasks*** *Richard Young*
8:30 a.m.	***2017-01-1380***	***Removing Biases from Crash Odds Ratio Estimates of Secondary Tasks: A New Analysis of the SHRP 2 Naturalistic Driving Study Data*** *Richard Young*
9:00 a.m.	***2017-01-1375***	***An Examination of Driver Eye Glance Behavior, Navigational Errors, and Subjective Assessments While Using In-Vehicle Navigational Systems With and Without Landmark Enhancements*** *Louis Tijerina, Ford Motor Company; Danielle Warren, Sang-Hwan Kim, Francine Dolins, University of Michigan-Dearborn*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1374***	***Varying Levels of Reality in Human Factors Testing: Parallel Experiments at Mcity and in a Driving Simulator*** *Michael J. Flannagan, University of Michigan - Ann Arbor; Shan Bao, Anuj Pradhan, University of Michigan; John Sullivan, University of Michigan - Ann Arbor; Yu Zhang, DENSO International America Inc.*
10:30 a.m.	***2017-01-1387***	***Optimizing Connected Vehicle Content Strategy for Drivers*** *Jing Zhang, AutoSimpler*
11:00 a.m.	***2017-01-1372***	***Driver Identification Using Vehicle Telematics Data*** *Bo Wang, Smruti Panigrahi, Mayur Narsude, Amit Mohanty, Ford Motor Company*

Planned by Human Factors Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Human Factors in Driving and Automotive Telematics (Part 2 of 2)

Session Code: ***SS302***

Room 140 D ***Session Time:*** ***1:00 p.m.***

As information and entertainment to and from the vehicle (Telematics) become more prolific it is critical to increase our understanding of how the driver understands and uses Telematics functions. Equally critical is how those functions impact the driver. This session will address those issues.

Organizers - *Kristin Kolodge, JD Power And Associates; Daniel J. Selke, Mercedes-Benz USA LLC*

Time	Paper No.	Title
1:00 p.m.	***2017-01-1382***	***Adaptive Cruise Control: First Impressions Matter*** *Michelle L. Reyes, Cheryl A. Roe, Ashley B. McDonald, Julia E. Friberg, Daniel V. McGehee, University of Iowa*
1:30 p.m.	***2017-01-1376***	***A Metric To Quantify Attentional Workload In Dual Task Driving Conditions*** *David H. Weir, Kevin Chao, R. Michael Van Auken, Dynamic Research, Inc.*
2:00 p.m.	***2017-01-1381***	***Human-Centered Measurement Scales in Automotive Product Development*** *Satheesh Kumar Chandran, James Forbes, Carrie Bittick, Shimul Bhuva, Ford Motor Company*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1378***	***Vehicle Touchscreen Shelf Study*** *Gianna F. Gomez-Levi, Ksenia Kozak, Nanxin Wang, Jian Wan, Linas Mikulionis, Ford Motor Company*
3:30 p.m.	***2017-01-1386***	***Can You Still Look Up? Remote Rotary Controller vs. Touchscreen*** *Yu Zhang, DENSO International America Inc.; Linda Angell, Touchstone Evaluations Inc; Silviu Pala, Tetsuya Hara, Doua Vang, DENSO International America Inc.*
4:00 p.m.	***2017-01-1385***	***Impact of Pre-Study Exploration on System Usability Scale and Task Success Rates for Automotive Interfaces*** *Satheesh Kumar Chandran, James Forbes, Carrie Bittick, Kathleen Allanson, Santosh Erupaka, Fnu Brinda, Ford Motor Company*
4:30 p.m.	***2017-01-1371***	***Modeling, Simulation and Experimental Analysis of Brake Pedal Feel for Passenger Car*** *Hao Pan, Xuexun Guo, Xiaofei Pei, Xingzhi Dong, Wuhan University of Technology*

Planned by Human Factors Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Occupant Protection: Accident Reconstruction (Part 3 of 3)

Session Code: ***SS500***

Room 140 E ***Session Time:*** ***8:00 a.m.***

This session focuses on the latest research related to methods and techniques for reconstructing vehicular crashes involving wheeled and tracked vehicles, pedestrians, and roadside features. Emphasis is placed on experimental data and theoretical methods that will enable reconstructionists to identify, interpret and analyze physical evidence from vehicular crashes.

Organizers - *Christopher D. Armstrong, Mecanica Scientific Svcs Corp.; Alan F. Asay, Armstrong Forensic Engineers Inc.; Jarrod Carter, Origin Engineering; Geoff Germane, Germane Engineering; Richard Frank Lambourn, Transport Research Laboratory, Ltd.; L. Daniel Metz, Metz Engineering & Racing; Nathan A. Rose, Kineticorp LLC*

Time	Paper No.	Title
8:00 a.m.	2017-01-1418	**Acceleration Testing of 2016 Kenworth T680 with Automated Manual Transmission in Auto Mode** *Wesley D. Grimes, Collision Engineering Associates Inc.; Thomas Vadnais, Vadnais Engineering; Gregory A. Wilcoxson, Wilcoxson Consulting LLC*
8:30 a.m.	2017-01-1426	**Acceleration Testing of 2016 Freightliner Cascadia with Automated Manual Transmission in Auto Mode** *Wesley D. Grimes, Collision Engineering Associates Inc.; Thomas H. Vadnais, Vadnais Engineering; Gregory A. Wilcoxson, Wilcoxson Consulting LLC*
9:00 a.m.	2017-01-1412	**Speedometers and Collision Reconstruction** *Christopher H. Goddard, Collision Science; David Price, Forensic Accident Investigations Inc*
9:30 a.m.		**BREAK**
10:00 a.m.	2017-01-1424	**A Study of In-Service Truck Weights** *Mark Fabbroni, Jennifer Rovt, Mark Paquette, -30- Forensic Engineering*
10:30 a.m.	2017-01-1427	**Deceleration Rates of Vehicles with Disabled Tires** *Daniel Koch, Gray Beauchamp, David Pentecost, Kineticorp LLC*

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Occupant Protection: Event Data Recorders (EDR)

Session Code: ***SS502***

Room 140 E ***Session Time:*** ***1:00 p.m.***

This session includes the latest research on Event Data Recorders (EDRs) equipped in passenger cars, light trucks, and commercial vehicles (heavy trucks and motorcoaches). Emphasis is placed on the application, interpretation and use of EDRs in the investigation of motor vehicle crashes.

Organizers - *David Plant, D P Plant & Associates; Heath Spivey, Delta V Forensic Engrg; John T. Sprague, General Motors LLC; John C. Steiner, Mecanica Scientific Services Corp.; Craig Wilkinson, MEA Forensic Engineers & Scientists*

Time	Paper No.	Title
1:00 p.m.	2017-01-1437	**An Introduction to the Forensic Acquisition of Passenger Vehicle Infotainment and Telematics Systems Data** *William Bortles, Sean McDonough, Connor Smith, Kineticorp, LLC; Michael Stogsdill, Collision Reconstruction Services, LLC*
1:30 p.m.	2017-01-1436	**An Analysis of EDR Data in Kawasaki Ninja 300 (EX300) Motorcycles** *Edward Fatzinger, Jon Landerville, Momentum Engineering Corp.*
2:00 p.m.	2017-01-1438	**Behavior of Toyota Airbag Control Modules Exposed to Low and Mid-Severity Collision Pulses** *Felix Lee, Peter Xing, Mike Yang, Janice Lee, Craig Wilkinson, Gunter P. Siegmund, MEA Forensic Engineers & Scientists*
2:30 p.m.		**BREAK**

3:00 p.m.	***2017-01-1439***	***Commercial Vehicle Global Positioning System Based Telematics Data Characteristics and Limitations*** *John C. Steiner, Christopher Armstrong, Mecanica Scientific Services Corp.; Tyler Kress, BEST Engineering Inc.; Tom Walli, GEOTAB, Inc.; Ralph J. Gallagher, UPS, Inc.; Justin Ngo, Andres Silva, Mecanica Scientific Services Corp.*
3:30 p.m.	***ORAL ONLY***	***Technical Keynote: Heavy Vehicle Event Data Recorders Needed to Improve Highway Safety: Lessons Learned from NTSB Investigations*** *Jane M. Foster, National Transportation Safety Board*

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Occupant Protection: Integrated Safety Systems

Session Code: ***SS503***

Room 140 F ***Session Time:*** ***1:00 p.m.***

This session offers technical papers covering integrated active and passive safety systems, including (1) A special topic on CFD simulation and testing of CO2 concentration, (2) occupant height and counting methods, (3) various restraint system configurations in automated vehicles, (4) drowsy driving avoidance simulation, (5) driving lane change control algorithm, and (6) driving fatigue detection.

Organizers - *Clifford C. Chou, Wayne State University; Jerry Le, Ford Motor Company; Lingxi Li, Indiana Univ. Purdue Univ. Indianapolis*

Chairpersons - *Jianbo Lu, Ford Motor Company*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1444***	***CO₂ Concentration in the Cabin in the Event of a Leak: CFD Simulation and Testing*** *Mitali Chakrabarti, Alfredo Perez Montiel, Israel Corrilo, Jing He, Angelo Patti, James Gebbie, Loren Lohmeyer, Bernd Dienhart, Klaus Schuermanns, Ford Motor Company*
1:30 p.m.	***2017-01-1443***	***Driving Fatigue Detection based on Blink Frequency and Eyes Movement*** *Lu ZiLin, Wuhan University of Technology; Gangfeng Tan, Wuhan Univ. of Tech / Virginia Tech; Yuxin Pang, YU TANG, Keyu Qian, Wuhan University of Technology*
2:00 p.m.	***2017-01-1442***	***An Indirect Occupancy Detection and Occupant Counting System Using Motion Sensors*** *Dawei Luo, Chongqing University; Jianbo Lu, Ford Motor Company; Gang Guo, Chongqing University*
2:30 p.m.		***BREAK***
3:00 p.m.	***ORAL ONLY***	***A Pre-and Post-Impact restraint system to protect occupants sitting on a freely reconfigurable seat for fully automated vehicles*** *Jaeyoung Moon, Il Bae, Yonsei Univ.*
3:30 p.m.	***ORAL ONLY***	***Auditory Brain Stimulation through IoT for Drowsiness Avoidance while Driving*** *Se Jin Park, Murali Subramaniyam, Seunghee Hong, Damee Kim, Korea Res. Inst. of Standards & Science; Seung Bum Oh, Young Hyun Lim, GEOMC*

4:00 p.m.	***2017-01-1441***	***Model Predictive Control based Automated Driving Lane Change Control Algorithm for Merge Situation on Highway Intersection*** *Heungseok Chae, Seoul National University; Kyong Chan Min, KATRI; Kyongsu Yi, Seoul National University*
4:30 p.m.	***2017-01-1440***	***A Method for Vehicle Occupant Height Estimation*** *Shixing Chen, Ming Dong, Wayne State University; Jerry Le, Mike Rao, Ford Motor Company*

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Tire and Wheel Technology (Part 1 of 2)

Session Code: ***SS700***

Room 140 G ***Session Time:*** ***8:00 a.m.***

The aim of this symposium is to provide a forum to bring together researchers do discuss and disseminate the research on tire and wheel technology. Examples of topics to this symposium include (but are not limited to) nonlinear behavior of tires and wheels, static/dynamic stress analysis, nonlinear material modeling, contact stress, impact, noise, vibration, traction, hydroplaning, effect of tires on vehicle performance, rolling resistance, and durability.

Organizers - *Volker Hildebrand, Continental Tire North America Inc.; David L. Howland, General Motors LLC; Neel K. Mani, Bridgestone Americas Inc.; Timothy A. Marantis, Bridgestone Americas Tire Operations LLC; Peter Thomas Tkacik, Univ. of North Carolina Charlotte; Rick S. Wallace, General Motors LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Technical Keynote: History of Characterizing Tire Forces & Moments Applied to a Vehicle*** *Characterizing the forces and moments that tires apply to vehicles has been an important activity in automotive engineering since it began. These forces were the reason behind both inventions of the pneumatic tire.* *Marion Giles Pottinger*
9:00 a.m.	***2017-01-1506***	***Using Generic Tyre Parameters for Low Friction Surfaces in Full Vehicle Simulations*** *Johannes Wiessalla, Yiqin Mao, Frank Esser, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1505***	***Parameterization Process of the Maxwell Model to Describe the Transient Force Behavior of a Tire*** *Andreas Hackl, Wolfgang Hirschberg, Cornelia Lex, Graz University of Technology; Georg Rill, OTH Regensburg*
10:30 a.m.	***2017-01-1507***	***Developing a Statistical Model to Predict Tire Noise at Different Speeds*** *Prashanta Gautam, University of Akron; Yousof Azizi, Bridgestone Americas Tire Operations LLC; Abhilash Chandy, University of Akron*

Planned by Tire and Wheel Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Tire and Wheel Technology (Part 2 of 2)

Session Code: ***SS700***

Room 140 G ***Session Time: 1:00 p.m.***

The aim of this symposium is to provide a forum to bring together researchers do discuss and disseminate the research on tire and wheel technology. Examples of topics to this symposium include (but are not limited to) nonlinear behavior of tires and wheels, static/dynamic stress analysis, nonlinear material modeling, contact stress, impact, noise, vibration, traction, hydroplaning, effect of tires on vehicle performance, rolling resistance, and durability.

Organizers - *Volker Hildebrand, Continental Tire North America Inc.; David L. Howland, General Motors LLC; Neel K. Mani, Bridgestone Americas Inc.; Timothy A. Marantis, Bridgestone Americas Tire Operations LLC; Peter Thomas Tkacik, Univ. of North Carolina Charlotte; Rick S. Wallace, General Motors LLC*

Time	Paper No.	Title
1:00 p.m.	2017-01-1533	***The Effects of Mass and Wheel Aerodynamics on Vehicle Fuel Economy*** *Kathleen DeMarco, James Stratton, Kevin Chinavare, Garry VanHouten, Lacks Wheel Trim Systems*
1:30 p.m.	2017-01-1502	***Tire Tread Performance Modification Utilizing Polymeric Additives*** *Madeline Harper, Janice Tardiff, Daniel Haakenson, Maria Joandrea, Matthew Knych, Ford Motor Company*
2:00 p.m.	2017-01-1504	***A Low Cost Rolling Road for Conducting Flow Measurements around a Tire in a Small Eiffel Wind Tunnel*** *Peter Tkacik, Zachary Carpenter, Aaron Gholston, Benjamin James Cobb, Sam Kennedy, Ethan Blankenship, Mesbah Uddin, Surya Phani Krishna Nukala, The University of North Carolina at Charlotte*
2:30 p.m.		***BREAK***
3:00 p.m.	2017-01-1503	***Heavy Truck Trailer Skid Wear as a Function of ABS Brake Configuration*** *Jared Johan Engelbrecht, Tony Russell Martin, Piyush M. Gulve, Nagarjun Chandrashekar, Amol Dwivedi, Peter Thomas Tkacik, The University of North Carolina at Charlotte; Zachary Merrill, Michelin North America*

Planned by Tire and Wheel Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Vehicle Aerodynamics (Part 3 of 6): CFD Methods Development

Session Code: ***SS800***

Room 141 ***Session Time: 8:00 a.m.***

Paper offers on the following topics are welcome: test facilities, unsteady aerodynamics, fuel economy, cooling airflow, fundamental aerodynamics and aerodynamics development.

Organizers - *Adrian P. Gaylard, Jaguar Land Rover; Taeyoung Han, General Motors LLC; Sivapalan Senthooran, Exa Corporation; Sandeep Sovani, ANSYS Inc.; Kurt Zielinski, Honda R & D Americas Inc.*

Time	Paper No.	Title
8:00 a.m.	2017-01-1510	***A Spline-Based Modeling Algorithm for Application to Aerodynamic Shape Optimization Based on CFD Analysis*** *Kisun Song, Kyung Hak Choo, Dimitri Mavris, Georgia Institute of Technology*

8:30 a.m.	***2017-01-1514***	***Comparison of the Far-Field Aerodynamic Wake Development for Three DrivAer Model Configurations using a Cost-Effective RANS Simulation*** *Renan F. Soares, Kevin P. Garry, Jennifer Holt, Cranfield University*
9:00 a.m.	***2017-01-1539***	***A CFD Analysis Method for Prediction of Vehicle Exterior Wind Noise*** *Vinh Long Phan, Hiroshi Tanaka, Takaaki Nagatani, Mikio Wakamatsu, Tsuyoshi Yasuki, Toyota Motor Corporation*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1532***	***Critical Assessment of Some Popular Scale-Resolving Turbulence Models for Vehicle Aerodynamics*** *Suad Jakirlic, Lukas Kutej, Technical University of Darmstadt; Peter Unterlechner, Audi AG; Cameron Tropea, Technical University of Darmstadt*
10:30 a.m.	***2017-01-1523***	***Improved RANS Computations of Flow over the 25Â°-Slant-Angle Ahmed Body*** *Robert Maduta, Outotec GmbH; Suad Jakirlic, Technical Univ. of Darmstadt*
11:00 a.m.	***2017-01-1524***	***An Extensive Validation of an Open Source Based Solution for Automobile External Aerodynamics*** *Robert Lietz, Levon Larson, Peter Bachant, John Goldstein, Rafael Silveira, Mehrdad Shademan, Ford Motor Company; Pete Ireland, Kyle Mooney, ICON*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00576, and also individually. T purchase visit collections.sae.org

Planned by Vehicle Aerodynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Vehicle Aerodynamics (Part 4 of 6): Surface Contamination and Unsteady Aerodynamics

Session Code: ***SS800***

Room 141 ***Session Time:*** ***1:00 p.m.***

Paper offers on the following topics are welcome: test facilities, unsteady aerodynamics, fuel economy, cooling airflow, fundamental aerodynamics and aerodynamics development.

Organizers - *Adrian P. Gaylard, Jaguar Land Rover; Jonathan Jilesen, Exa Corporation; Raymond Leto, TotalSim, Ltd.; Nicholas Oettle, Jaguar Land Rover; David Sims-Williams, Durham Univ.; Behtash Tavakoli, Ford North American Car; Mesbah Uddin, UNC Charlotte Motorsports Engineering; Kurt Zielinski, Honda R & D Americas Inc.*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1543***	***Numerical Investigation of Features Affecting Rear and Side Body Soiling*** *Jonathan Jilesen, Exa Corporation; Adrian Gaylard, Jaguar Land Rover; Jose Escobar, Exa Corporation*
1:30 p.m.	***2017-01-1511***	***A Parametric Study of Automotive Rear End Geometries on Rear Soiling*** *Anton Kabanovs, Graham Hodgson, Andrew Garmory, Martin Passmore, Loughborough University; Adrian Gaylard, Jaguar Land Rover*
2:00 p.m.	***2017-01-1552***	***Coupled Level-Set Volume of Fluid Simulations of Water Flowing Over a Simplified Drainage Channel With and Without Air Coflow*** *Mehriar Dianat, Maciej Skarysz, Graham Hodgson, Andrew Garmory, Martin Passmore, Loughborough University*

2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1515***	***The Application of a One-Way Coupled Aerodynamic and Multi-Body Dynamics Simulation Process to Predict Vehicle Response during a Severe Crosswind Event*** *Neil Lewington, Lauri Ohra-aho, Olav Lange, Klaus Rudnik, Ford Motor Company*
3:30 p.m.	***2017-01-1525***	***Coupled 6DoF Motion and Aerodynamic Crosswind Simulation Incorporating <bold>Driver Model</bold>*** *Kosuke Nakasato, Nissan Motor Co., Ltd.; Makoto Tsubokura, Jun Ikeda, Kobe University; Keiji Onishi, RIKEN Advanced Institute; Shoya Ota, Hiroki Takase, Kei Akasaka, Hisashi Ihara, Munehiko Oshima, Toshihiro Araki, Nissan Motor Co., Ltd.*
4:00 p.m.	***2017-01-1545***	***Experimental Investigation of Aeroacoustic Cabin Noise in Unsteady Flow by Means of a New Turbulence Generating Device*** *Susumu Terakado, Takafumi Makihara, Takashi Sugiyama, Kazuhiro Maeda, Kenji Tadakuma, Kentaro Tsuboi, Toyota Motor Corporation; Masashi Iyota, Kazuyoshi Kosaka, Sadato Sugiyama, Mitsubishi Heavy Industries Ltd.*
4:30 p.m.	***2017-01-1549***	***Unsteady Aerodynamic Response of a Vehicle by Natural Wind Generator of a Full-Scale Wind Tunnel*** *Taro Yamashita, Takafumi Makihara, Kazuhiro Maeda, Kenji Tadakuma, Toyota Motor Corporation*

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Planned by Vehicle Aerodynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Electric Vehicle Drivetrain Dynamics

Session Code: ***SS901***

Room 142 A ***Session Time:*** ***1:00 p.m.***

This session deals with the analytical and experimental studies of vehicle electric drive vehicles or any non-conventional vehicle concepts that stretch the vehicle dynamics/mobility performance using intelligent technologies such as in-wheel motors, torque-vectoring controls, multi-wheel steer-by-wire, etc.

Organizers - *Gary J. Heydinger, SEA, Ltd.; M. Kamel Salaani, Transportation Research Center Inc.*

Chairpersons - *M. Kamel Salaani, Transportation Research Center Inc.*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1597***	***Torque-Vectoring Control for an Autonomous and Driverless Electric Racing Vehicle with Multiple Motors*** *Christoforos Chatzikomis, Aldo Sorniotti, Patrick Gruber, University of Surrey; Matthew Bastin, Raja Mazuir Shah, Yuri Orlov, Charge Automotive Ltd.*
1:30 p.m.	***2017-01-1596***	***Improvement in Shift Quality in a Multi Speed Gearbox of an Electric Vehicle through Synchronizer Location Optimization*** *Amar Penta, Rohit Gaidhani, Tata Motors, Ltd.; Sampath Kumar Sathiaseelan, Tata Technologies Ltd; Prasad Warule, Tata Motors Ltd*

2:00 p.m.	***2017-01-1594***	***Matching Design and Parameter Sensitivity Analysis of Micro Electric Vehicle Drive-motorâ€™s Power***
		Guirong Zhuo, Kun Xiong, Subin Zhang, Tongji University
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1595***	***Use of Electric Driveline for a Cooperative Braking Strategy***
		Mustafa Ali Arat, Hans-Martin Duringhof, Johan Hagnander, Eduardo L. Simoes, NEVS
3:30 p.m.	***2017-01-1593***	***Drive Cycle Development for Electrical Three Wheelers***
		Sunil kumar Pathak, Yograj Singh, Vineet Sood, CSIR-Indian Institute of Petroleum; Salim Abbasbhai Channiwala, S V National Institute of Technology

Planned by Vehicle Dynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Vehicle Dynamics, Stability and Control (Part 3 of 5)

Session Code: ***SS900***

Room 142 B ***Session Time:*** ***8:00 a.m.***

This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of passenger cars, heavy trucks, and wheeled military vehicles. This session addresses active and passive safety systems to mitigate rollover, yaw instability and braking issues; driving simulators and hardware-in-the-loop systems; suspension kinematics and compliance, steering dynamics, advanced active suspension technologies; and tire force and moment mechanics.

Organizers - *W. Riley Garrott, National Hwy Traffic Safety Admin; Paul Grygier; Gary J. Heydinger, SEA, Ltd.; David R. Mikesell, Ohio Northern Univ.; Sughosh J. Rao, M. Kamel Salaani, Transportation Research Center Inc.*

Chairpersons - *M. Kamel Salaani, Sughosh J. Rao, Transportation Research Center Inc.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1580***	***A Review of Car-Trailer Lateral Stability Control Approaches***
		Smitha Vempaty, Yuping He, University of Ontario Institute of Technology
8:30 a.m.	***2017-01-1588***	***Development of A Dynamic Modeling Framework to Predict Instantaneous Status of Towing Vehicle Systems***
		Yucheng Liu, Mississippi State Univ.; Collin Davenport, Mississippi State University; James Gafford, Michael Mazzola, John Ball, Sherif Abdelwahed, Matthew Doude, Mississippi State Univ; Reuben Burch, Mississippi State University
9:00 a.m.	***2017-01-1554***	***Kinematic Analysis of Tractor-Semitrailer with Split Fifth Wheel Coupling During Low Speed Turning Maneuvers***
		Ajith Jogi, Sujatha Chandramohan, Indian Institute of Technology - Madras
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1556***	***An Advanced Yaw Stability Control System***
		Jianbo Lu, Li Xu, Daniel Eisele, Stephen Samuel, Matthew Rupp, Levasseur Tellis, Ford Motor Company
10:30 a.m.	***2017-01-1574***	***Longitudinal Vehicle Dynamics Modeling and Parameter Estimation for Plug-in Hybrid Electric Vehicle***
		Sindhura Buggaveeti, Mohit Batra, John McPhee, Nasser Azad, University of Waterloo

11:00 a.m.	***2017-01-1589***	***Bifurcation Analysis of a Car Model Running on an Even Surface - A Fundamental Study for Addressing Automomous Vehicle Dynamics*** *Giampiero Mastinu, Fabio Della Rossa, Massimiliano Gobbi, Giorgio Previati, Politecnico di Milano*
11:30 a.m.	***2017-01-1553***	***Transient Nonlinear Full-Vehicle Vibration Analysis*** *Min Kyoo Kang, Jin Hong Kim, HyuckJin Oh, Wookjin Jang, Sangwoo Lee, Hyundai Motor Company; Young Hwan Lee, IISO Inc.*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00575, and also individually. T purchase visit collections.sae.org

Planned by Vehicle Dynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Vehicle Dynamics, Stability and Control (Part 4 of 5)

Session Code: ***SS900***

Room 142 B ***Session Time:*** ***1:00 p.m.***

This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of passenger cars, heavy trucks, and wheeled military vehicles. This session addresses active and passive safety systems to mitigate rollover, yaw instability and braking issues; driving simulators and hardware-in-the-loop systems; suspension kinematics and compliance, steering dynamics, advanced active suspension technologies; and tire force and moment mechanics.

Organizers - *W. Riley Garrott, National Hwy Traffic Safety Admin; Paul Grygier; Gary J. Heydinger, SEA, Ltd.; David R. Mikesell, Ohio Northern Univ.; Sughosh J. Rao, M. Kamel Salaani, Transportation Research Center Inc.*

Chairpersons - *David R. Mikesell, Ohio Northern Univ.; Sughosh J. Rao, Transportation Research Center Inc.*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1566***	***New Motion Cueing Algorithm for Improved Evaluation of Vehicle Dynamics on a Driving Simulator*** *Willibald Brems, University of Stuttgart; Nico Kruithof, Cruden B.V.; Richard Uhlmann, Andreas Wagner, Audi AG; Werner Krantz, Jochen Wiedemann, University of Stuttgart*
1:30 p.m.	***2017-01-1564***	***Subjective Perception and Evaluation of Driving Dynamics in the Virtual Test Drive*** *Minh-Tri Nguyen, JÃ¼rgen Pitz, Werner Krantz, IVK, University of Stuttgart; Jens Neubeck, FKFS; Jochen Wiedemann, IVK, University of Stuttgart*
2:00 p.m.	***2017-01-1573***	***Effect of Force Vectoring Spring implementation into a Twistbeam Rear Suspension*** *Andreas Carlitz, Sebastien Allibert, Thomas Schmitz, Axel Engels, Ford Motor Company*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1561***	***Active Hydraulically Interconnected Suspension. Modeling and Simulation*** *Anton A. Tkachev, Nong Zhang, University of Technology Sydney*
3:30 p.m.	***2017-01-1565***	***Research on Vehicle Stability Control Strategy Based on Integrated-Electro-Hydraulic Brake System*** *Xiangkun He, Kaiming Yang, Xuewu Ji, Yahui Liu, Tsinghua University; Weiwen Deng, Jilin University*

4:00 p.m.	***2017-01-1581***	***A System for Autonomous Braking of a Vehicle Following Collision*** *Jianbo Lu, Hassen Hammoud, Todd Clark, Otto Hofmann, Mohsen Lakehal-ayat, Shweta Farmer, Jason Shomsky, Roland Schaefer, Ford Motor Company*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00575, and also individually. T purchase visit collections.sae.org

Planned by Vehicle Dynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Advances in Instrument Panels, Seats, and Interiors (Part 1 of 2)

Session Code: ***M301***

Room 142 C ***Session Time:*** ***8:00 a.m.***

This session will feature technical presentations that will discuss new technology and industry insights in automotive interiors. Focus areas include materials, perceived quality, environmental concerns, manufacturing, safety, and durability.

Organizers - *Robert Egbers, Comusa; Lisa Fallon, General Motors LLC; Sreenivas Kuchibhatla, Ford Motor Company; Stephen M. Pitrof, Inteva LLC; Santosh Kumar Sarang, Aisin Technical Center of America; Ravi Thyagarajan, US Army TARDEC; Bryant Tokarz, O-Flex Group Inc.*

Chairpersons - *Stephen M. Pitrof, Inteva LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0493***	***Utilization of CAE Tools to Assist Active Glove Box Design*** *Li Lu, Sean West, Stacey Raines, Jin Zhou, Paul Hoke, Yi Yang Tay, Ford Motor Company*
8:30 a.m.	***2017-01-0495***	***Effects of Material Touch-Sounds on Perceived Quality of Surfaces*** *Michael Christian Haverkamp, Ford Motor Company*
9:00 a.m.	***2017-01-0492***	***Effect of PVC Skin and Its Properties on Automotive Door Trim Inserts*** *Mahendra Beera, Dinesh Pahuja, Arpit Kapila, Rajat Handa, Sandeep Raina, Maruti Suzuki India Ltd.*
9:30 a.m.		***BREAK***
10:00 a.m.	***Panel***	***Technical Expert Panel Discussion: Lightweighting and Environmental Sustainability in the Automotive Interior*** ***Moderators -*** *Lisa Fallon, General Motors LLC* ***Panelists -*** *Timothy Boundy, General Motors LLC; Gary D. Mullen, Ford Body Engrg; Joseph Tereau, FCA US LLC; Ravi Thyagarajan, US Army TARDEC;*

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Wednesday, April 5

Advances in Instrument Panels, Seats, and Interiors (Part 2 of 2)

Session Code: ***M301***

Room 142 C ***Session Time:*** ***1:00 p.m.***

This session will feature technical presentations that will discuss new technology and industry insights in automotive interiors. Focus areas include materials, perceived quality, environmental concerns, manufacturing, safety, and durability.

Organizers - *Robert Egbers, Comusa; Lisa Fallon, General Motors LLC; Sreenivas Kuchibhatla, Ford Motor Company; Stephen M. Pitrof, Inteva LLC; Santosh Kumar Sarang, Aisin Technical Center of America; Ravi Thyagarajan, US Army TARDEC; Bryant Tokarz, O-Flex Group Inc.*

Chairpersons - *Santosh Kumar Sarang, Aisin Technical Center of America*

Time	Paper No.	Title
1:00 p.m.	***2017-01-0497***	***Characterizing Vehicle Occupant Body Dimensions and Postures Using a Statistical Body Shape Model*** *Byoung-Keon Daniel Park, UMTRI; Matthew P. Reed, University of Michigan*
1:30 p.m.	***2017-01-0491***	***Polyurethane Reactive (PUR) Adhesive to Improve Heat Resistance for Car Seat Attachment Techniques*** *Hyerin Choi, Jaeyong Ko, JunHo Song, Hyundai-Dymos Inc.; SeungKeon Woo, MUJIN*
2:00 p.m.	***2017-01-0494***	***Multisensory Contributions to Perceived Quality and Authenticity of Materials for the Vehicle Interior*** *Michael Christian Haverkamp, Anja Moos, Ford Motor Company*

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Wednesday, April 5

Advances in Particulate Filter Substrates(Part 1 of 2)

Session Code: ***PFL423***

Room 250 A ***Session Time:*** ***8:00 a.m.***

This session has one presentation on an advanced DOC for the diesel particulate filter (DPF). The remaining talks cover the DPF technology from new substrate designs to studying the ash deposition and ash morphology followed by two presentations investigating biodiesel effect on emissions and in combination with the DPF.

Organizers - *Kirby Baumgard, John Deere Power Systems; Ameya Joshi, Corning Inc.; Jong Lee, Aramco Research Center; Julian Tan, Ford Motor Company*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0928***	***Diesel Oxidation Catalysts with Ultra-Low NO₂ Emissions Supported by Nano-Washcoat on Sintered Metal Fibers*** *Osama M. Ibrahim, Kuwait University*
8:30 a.m.	***2017-01-0925***	***Development of Meshwork DPF Catalyst for Fuel Economy Improvement*** *Tatsuro Sugino, Eriko Tanaka, Huong Tran, Norihiko Aono, Cataler Co., Ltd.*
9:00 a.m.	***2017-01-0926***	***Catalyst Performance of Monolith-Type Diesel Particulate Filter having Microgear-Design based on Asymmetric Hexagonal Channel Geometry*** *Kentaro Iwasaki, Sumika Ceramics Poland Sp. z o.o*
9:30 a.m.	***2017-01-0927***	***Ash Permeability Determination in the Diesel Particulate Filter from Ultra-High Resolution 3D X-Ray Imaging and Image-Based Direct Numerical Simulations*** *Carl Justin Kamp, Massachusetts Institute of Technology; Shawn Zhang, DigiM Solution LLC; Sujay Bagi, Victor Wong, Greg Monahan, Alexander Sappok, Massachusetts Institute of Technology; Yujun Wang, Cummins*
10:00 a.m.		***BREAK***

10:30 a.m.	***ORAL ONLY***	***Effect of regeneration strategy on ash-filter interactions in diesel particulate filters*** *Charles E.A. Finney, Todd J. Toops, Oak Ridge National Laboratory*
11:00 a.m.	***2017-01-0932***	***Influence of Biodiesel Blending on Particulate Matter (PM) Oxidation Characteristics*** *Nehemiah S I Alozie, University Of Lagos Akoka Nigeria; George Fern, David Peirce, Lionel Ganippa, Brunel University*
11:30 a.m.	***2017-01-0933***	***Experimental Study on Particulate Emission Characteristics of an Urban Bus Equipped with CCRT After-treatment System Fuelled with Biodiesel Blend*** *Yunhua Zhang, Diming Lou, Piqiang Tan, Zhiyuan Hu, Qian Feng, Tongji University*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Advances in Particulate Filter Substrates (Part 2 of 2)

Session Code: ***PFL423***

Room 250 A ***Session Time:*** ***2:00 p.m.***

This session has one presentation on an advanced DOC for the diesel particulate filter (DPF). The remaining talks cover the DPF technology from new substrate designs to studying the ash deposition and ash morphology followed by two presentations investigating biodiesel effect on emissions and in combination with the DPF.

Organizers - *Kirby Baumgard, John Deere Power Systems; Ameya Joshi, Corning Inc.; Jong Lee, Aramco Research Center; Julian Tan, Ford Motor Company*

Time	***Paper No.***	***Title***
2:00 p.m.	***2017-01-0929***	***Development of new coating technology optimized for each function of coated GPF*** *Satoru Inoda, Yasutaka Nomura, Hirotaka Ori, Yuji Yabuzaki, Cataler Co., Ltd.*
2:30 p.m.	***2017-01-0931***	***Control Strategies for Gasoline Particulate Filters*** *Michiel Van Nieuwstadt, Joseph Ulrey, Ford Motor Company*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0930***	***Analysis of ash in low mileage, rapid aged, and high mileage gasoline exhaust particle filters*** *Christine K. Lambert, Timothy Chanko, Mark Jagner, Jon Hangas, Xin Liu, James Pakko, Ford Motor Company; Carl Justin Kamp, Massachusetts Institute of Technology*
4:00 p.m.	***2017-01-0924***	***Impact of European Real-Driving-Emissions Legislation on Exhaust Gas Aftertreatment Systems of Turbocharged Direct Injected Gasoline Vehicles*** *Jan Schoenhaber, Nikolas Kuehn, Bastian Bradler, Joerg Michael Richter, Umicore AG & Co. KG; Sascha Bauer, Bernd Lenzen, Christian Beidl, TU Darmstadt*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

System Integration And Durability (Part 2 of 2)

Session Code: ***PFL421***

Room 250 B ***Session Time:*** ***8:00 a.m.***

This session encompasses studies in the area of exhaust aftertreatment integration and durability. Topics of interest include detailed studies on the caveats of aftertreatement system design, integration and performance. Other topics of interest include studies documenting the challenges and solutions related to durability and robustness of catalytic solutions.

Organizers - *Eric Corrigan, Angus Craig, Corning Inc.; Cary Henry, Southwest Research Institute; Pradeep Prasad, Cummins Inc.*

Time	Paper No.	Title
8:30 a.m.	***2017-01-0913***	***Real Driving Emission efficiency potential of SDPF systems without an ammonia slip catalyst*** *Evangelos Georgiadis, DENSO Automotive Deutschland GmbH; Toru Kudo, DENSO Corporation; Olaf Herrmann, DENSO Automotive Deutschland GmbH; Ken Uchiyama, DENSO Corporation; Juergen Hagen, DENSO Automotive Deutschland GmbH*
9:00 a.m.	***2017-01-0915***	***Urea deposit formation and chemical transformation process of diesel aftertreatment system*** *Haomiao Zhang, Massachusetts Institute of Technology; Yuanzhou Xi, Changsheng Su, Z. Gerald Liu, Cummins Emission Solutions*
9:30 a.m.	***2017-01-0916***	***Comprehensive OBD System Maturity*** *Mohammad Hijawi, Shirin Badiei, Nicole M. Waters, FCA US LLC*
3:00 p.m.		***BREAK***

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Particle Emissions from Combustion Sources (Part 1 of 3)

Session Code: ***PFL450***

Room 250 B ***Session Time:*** ***10:30 a.m.***

This technical session addresses particle emissions from combustion engines, including measurement and testing methods, and the effects of changes in fuel composition. Also included are topics on environmental and health effects of elemental carbon and organic carbon that constitutes solid cored particles plus the environmental and health effects of secondary organic aerosol emissions. This encompasses particulate emissions from both gasoline and diesel engines.

Organizers - *Imad A. Khalek, Southwest Research Institute; Amanda Lea-Langton, Univ. of Manchester; Matti Maricq, Ford Motor Company; Andrea Strzelec, Texas A&M University*

Time	Paper No.	Title
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1007***	***Investigations into Exhaust Particulate Emissions from Multiple Vehicle Types Running on Two Chassis Dynamometer Driving Cycles*** *Piotr Bielaczyc, Andrzej Szczotka, Joseph Woodburn, BOSMAL Automotive R & D Institute Ltd.*
11:00 a.m.	***2017-01-1005***	***Effects of Fuel Chemistry and Spray Properties on Particulate Size Distributions from Dual-Fuel Combustion Strategies*** *Yizhou Zhang, Jaal Ghandhi, David Rothamer, University of Wisconsin*

11:30 a.m.	***2017-01-1008***	***A New Miniaturized Sensor for Ultra-Fast On-Board Soot Concentration Measurements*** *Antti Rostedt, Leonidas D. Ntziachristos, Pauli Simonen, Topi RÃ¶nkkÃ¶, Tampere University of Technology; Zissis C. Samaras, Aristotle University of Thessaloniki; Risto Hillamo, Finnish Meteorological Institute; Kauko Janka, Pegasor Oy; Jorma Keskinen, Tampere University of Technology*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Particle Emissions from Combustion Sources (Part 2 of 3)

Session Code: ***PFL450***

Room 250 B ***Session Time:*** ***1:30 p.m.***

This technical session addresses particle emissions from combustion engines, including measurement and testing methods, and the effects of changes in fuel composition. Also included are topics on environmental and health effects of elemental carbon and organic carbon that constitutes solid cored particles plus the environmental and health effects of secondary organic aerosol emissions. This encompasses particulate emissions from both gasoline and diesel engines.

Organizers - *Imad A. Khalek, Southwest Research Institute; Amanda Lea-Langton, Univ. of Manchester; Matti Maricq, Ford Motor Company; Andrea Strzelec, Texas A&M University*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-1001***	***A New On-Board PN Analyzer for Monitoring the Real-Driving Condition*** *Seyoung Kim, Kenji Kondo, Yoshinori Otsuki, Kazuhiko Haruta, Horiba Ltd.*
2:00 p.m.	***2017-01-1002***	***Effects of Fuel Properties Associated with In-cylinder Behavior on Particulate Number from a Direct Injection Gasoline Engine*** *Daisuke Tanaka, Ryo Uchida, Toru Noda, Nissan Motor Co., Ltd.; Andreas Kolbeck, Shell Global Solutions; Sebastian Henkel, Yannis Hardalupas, Alexander Taylor, Imperial College London; Allen Aradi, Shell Global Solutions*
2:30 p.m.	***ORAL ONLY***	***Comparison of Particulate Emissions from Advanced and Modern Conventional Combustion Engines Measured by SMPS, EEPS, and Micro Soot Sensor (MSS)*** *Seungmok Choi, HeeJe Seong, Andrew Ickes, Stephen Ciatti, Khanh Cung, Argonne National Laboratory; Sherrie Elzey, TSI Incorporated*
3:00 p.m.		***BREAK***
3:30 p.m.	***ORAL ONLY***	***CRC Project No. E-99-2: Very Low PM Mass Measurements Phase 2: Evaluation of Partial Flow Dilution*** *Thomas D. Durbin, University of California - Merced*
4:00 p.m.	***ORAL ONLY***	***Particle Emissions during GDI Engine Start-UP (Cranking) Under Chassis Dyno Testing with Varied Fuel Properties*** *Imad A. Khalek, Vinay Premnath, Southwest Research Institute*
4:30 p.m.	***ORAL ONLY***	***Gaseous and Particulate Emissions from a Gasoline Direct Injection Vehicle With and Without a Gasoline Particulate Filter*** *Jiacheng Yang, Thomas Durbin, University Of California Riverside; Michael Geller, Rasto Brezny, Manufacturers of Emission Controls Assoc; George Karavalakis, University Of California Riverside*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Climate Control (Part 1 of 3)

Session Code: ***HX104***

Room 250 C ***Session Time:*** ***8:00 a.m.***

Climate control is a defining vehicle attribute and is associated with brand image. Thermal performance and quality of climate control are both critical to customer satisfaction. The system has strong design interaction with other vehicle systems, while its primary objective is to deliver thermal comfort and occupant safety with low energy consumption. Localized Comfort, Secondary Fluids, Air Quality, Controls, System Sizing and HVAC consumer interface are just a few of the recent advances.

Organizers - *Bashar AbdulNour, Ford Motor Company; Jeffrey Bozeman, General Motors LLC; Hector Cano, Bergstrom Inc.; Jie Zeng, Denso; Tao Zhan, California Air Resources Board*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0180***	***Efficiency Improvement by Separation of Vapor and Liquid in Condenser Headers***
		Jun Li, Pega Hrnjak, University of Illinois at Urbana-Champaign
8:30 a.m.	***2017-01-0165***	***Influence of Nozzle Divergent Part Length and Throat Diameter on Vortex Control of Initially Subcooled Flashing Flow***
		Jingwei Zhu, Stefan Elbel, University of Illinois
9:00 a.m.	***2017-01-0178***	***Coupling a Passive Sensor Manikin with a Human Thermal Comfort Model to Predict Human Perception in Transient and Asymmetric Environments***
		Mark Hepokoski, Allen Curran, ThermoAnalytics Inc.; Sam Gullman, David Jacobsson, Volvo Car Corporation
9:30 a.m.	***2017-01-0170***	***Optimum Seat Cooling Distribution for Targeted Human Thermal ComfortÂ®***
		Aditya Velivelli, Daniel Guerithault, Stefan StÃ¶we, Gentherm
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0163***	***Development of a Model to Predict Build-up of Cabin Carbon Dioxide Concentrations in Automobiles for Indoor Air Quality***
		Gursaran D. Mathur, CalsonicKansei North America Inc.
11:00 a.m.	***2017-01-0175***	***R744 Parallel Compression Cycle for Automotive Climate Control***
		Jing He, Bill Johnston, Debasish Dhar, Loren Lohmeyer, Ford Motor Company
11:30 a.m.	***2017-01-0174***	***A Rapid Screening Test to Assess Relative Corrosion Performance of Automotive Condensers***
		Ravi Rungta, EIG, Inc; Noori Pandit, Ford Motor Company

Planned by Thermal Management Activity / EMB Land and Sea Group

Wednesday, April 5

Climate Control (Part 2 of 3)

Session Code: ***HX104***

Room 250 C ***Session Time:*** ***1:30 p.m.***

Climate control is a defining vehicle attribute and is associated with brand image. Thermal performance and quality of climate control are both critical to customer satisfaction. The system has strong design interaction with other vehicle systems, while its primary objective is to deliver thermal comfort and occupant safety with low energy consumption. Localized Comfort, Secondary Fluids, Air Quality, Controls, System Sizing and HVAC consumer interface are just a few of the recent advances.

Organizers - *Bashar AbdulNour, Ford Motor Company; Jeffrey Bozeman, General Motors LLC; Hector Cano, Bergstrom Inc.; Jie Zeng, Denso; Tao Zhan, California Air Resources Board*

Time	Paper No.	Title

1:30 p.m.	***2017-01-0162***	***Experimentally Validated Effects of Separation of Liquid and Vapor on Performance of Condenser and System*** *Jun Li, Lili Feng, Pega Hrnjak, University of Illinois at Urbana-Champaign*
2:00 p.m.	***2017-01-0177***	***Refrigerant Charge Imbalance in a Mobile Reversible Air Conditioning-Heat Pump System*** *Lili Feng, Predrag Hrnjak, University of Illinois at Urbana-Champaign*
2:30 p.m.	***2017-01-0173***	***Comparative Manufacturing and Ownership Cost Estimates for Secondary Loop Mobile Air Conditioning Systems (SL-MACs)*** *Stephen Andersen, Inst. for Governance & Sust. Development; Sourav Chowdhury, Mahle Behr Troy Inc.; Timothy Craig, Mahle; Sangeet Kapoor, Jagvendra Meena, Prasanna Nagarhalli, Tata Motors, Ltd.; Melinda Soffer, Inst. for Governance & Sust. Development; Lindsey Leitzel, MAHLE; James Baker*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0172***	***NVH Challenges with Introduction of New Refrigerant HFO-1234yf*** *Suhas Venkatappa, Manfred Koberstein, Zhengyu Liu, Ford Motor Company*
4:00 p.m.	***2017-01-0167***	***Automotive A/C Servicing â€“ Refrigerant Flushing of a Failed A/C System*** *Steven Lambert, William Jamo, Mike Kurtz, Ford Motor Company*
4:30 p.m.	***2017-01-0176***	***A DFSS Approach to Optimize the Second Row Floor Duct Using Parametric Modelling*** *B. Vasanth, Uday Putcha, S. Sathish Kumar, FCA Engineering India Pvt Ltd; Ramakrishna nukala, FCA Engineering India PVT LTD; Murali Govindarajalu, FCA US LLC*

Planned by Thermal Management Activity / EMB Land and Sea Group

Wednesday, April 5

Combustion in Compression-Ignition Engines: Efficiency and Emissions (Part 1 of 2)

Session Code: ***PFL221***

Room 251 A ***Session Time:*** ***8:30 a.m.***

Papers focusing on efficiency and emissions for classical diesel engine combustion with relatively short ignition delay, including papers dealing with low compression ratio and high exhaust-gas recirculation calibrations. Subject matter may include both experimental and simulation results focused on applications of piston bowl design, heat transfer, and fuel injection, or other factors affecting fuel efficiency and engine-out emissions.

Organizers - *Raul Payri, Jose M Garcia-Oliver, Universitat Politecnica de Valencia; Dale R. Tree, Brigham Young Univ.; Song-Charng Kong, Iowa State Univ.; Yongli Qi, Caterpillar Inc.; John F. Wright, Cummins Inc.; Ming Zheng, Univ. of Windsor; Mark P. B. Musculus, Sandia National Laboratories; Robert M. McDavid, Caterpillar Inc.*

Chairpersons - *Song-Charng Kong, Ryan M. Ogren, Iowa State Univ.*

Time	***Paper No.***	***Title***
8:30 a.m.	***2017-01-0698***	***Meeting 2025 CAFE Standards for LDT with Fuel-Efficient Diesel Powertrains - Approaches and Solutions*** *Thomas Koerfer, FEV Group Holding GmbH; Dean Tomazic, FEV North America, Inc.; Werner Bick, Christoph Menne, FEV GmbH; Michael Franke, FEV North America, Inc.*

9:00 a.m.	***2017-01-0706***	***Combustion Noise Reduction with High Thermal Efficiency by the Control of Multiple Fuel Injections in Premixed Diesel Engines*** *Gen Shibata, Hideyuki Ogawa, Yuki Okamoto, Yasumasa Amanuma, Yoshimitsu Kobashi, Hokkaido University*
9:30 a.m.	***2017-01-0703***	***Understanding Hydrocarbon Emissions in Heavy Duty Diesel Engines Combining Experimental and Computational Methods*** *Chad Koci, Adam Dempsey, Jeffery Nudd, Bradley Knier, Caterpillar Inc.*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0723***	***Optimization of an Advanced Combustion Strategy Towards 55% BTE for the Volvo SuperTruck Program*** *Jacqueline O'Connor, Meghan Borz, Daniel Ruth, Jun Han, Chandan Paul, Abdurrahman Imren, Daniel Haworth, Pennsylvania State University; Jonathan Martin, Andre Boehman, University of Michigan; Jian Li, Kevin Heffelfinger, Samuel McLaughlin, Richard Morton, Arne Andersson, Anders Karlsson, Volvo Group Trucks Technology*
11:00 a.m.	***2017-01-0724***	***Conceptual Investigation of the Origins of Hydrocarbon Emissions from Mixing-Controlled, Compression-Ignition Combustion*** *A. S. (Ed) Cheng, San Francisco State University; Charles J. Mueller, Sandia National Laboratories*
11:30 a.m.	***2017-01-0695***	***Steady-State and Transient Operations of a Euro VI 3.0L HD Diesel Engine with Innovative Model-Based and Pressure-Based Combustion Control Techniques*** *Ezio Spessa, Stefano D'Ambrosio, Daniele Iemmolo, Alessandro Mancarella, Roberto Vitolo, Politecnico di Torino; Gilles Hardy, FPT Motorenforschung AG*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Combustion in Compression-Ignition Engines: Efficiency and Emissions (Part 2 of 2)

Session Code: ***PFL221***

Room 251 A ***Session Time:*** ***2:00 p.m.***

Papers focusing on in-cylinder processes of classical diesel engine combustion with relatively short ignition delay, including papers dealing with low compression ratio and high exhaust-gas recirculation calibrations. Subject matter may include both simulation results and experimental work, including applications of optical diagnostics, with emphasis on in-cylinder spray, evaporation, mixing, pollutant formation/destruction, or any other in-cylinder phenomena.

Organizers - *Raul Payri, Jose M Garcia-Oliver, Universitat Politecnica de Valencia; Dale R. Tree, Brigham Young Univ.; Song-Charng Kong, Iowa State Univ.; Yongli Qi, Caterpillar Inc.; John F. Wright, Cummins Inc.; Ming Zheng, Univ. of Windsor; Mark P. B. Musculus, Sandia National Laboratories; Robert M. McDavid, Caterpillar Inc.*

Chairpersons - *Anand Nageswaran Bharath, Cummins Engine Co., Ltd.; Louis-Marie Malbec, IFP Energies Nouvelles*

Time	***Paper No.***	***Title***
2:00 p.m.	***2017-01-0718***	***Investigation of Small Pilot Combustion in a Heavy-Duty Diesel Engine*** *Carlos Jorques Moreno, Ola Stenlaas, Scania CV AB; Per Tunestal, Lund University*

2:30 p.m.	***2017-01-0708***	***Influence of Small Pilot on Main Injection in a Heavy-Duty Diesel Engine*** *Carlos Jorques Moreno, Ola Stenlaas, Scania CV AB; Per Tunestal, Lund University*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0713***	***Development of the Combustion System for Volvo Cars Euro6d VEA Diesel Engine*** *HÃ¥kan Persson, Aristotelis Babajimopoulos, Arjan Helmantel, Fredrik Holst, Elin Stenmark, Volvo Car Corporation*
4:00 p.m.	***2017-01-0700***	***Investigations on Gaseous Emissions, Sound and Vibrations Levels of a DI Engine Fueled with 100% Cottonseed Biodiesel*** *Valentin Soloiu, Aliyah Knowles, Jose Moncada, Emerald Simons, Martin Muinos, Thomas Beyerl, Georgia Southern University*
4:30 p.m.	***2017-01-0701***	***Augmentation of an Artificial Neural Network (ANN) Model with Expert Knowledge of Critical Combustion Features for Optimizing a Compression Ignition Engine Using Multiple Injections*** *Aaron M. Bertram, Song-Charng Kong, Iowa State University*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Abnormal SI Combustion (Knock) (Part 1 of 2)

Session Code: ***PFL213***

Room 251 B ***Session Time:*** ***8:00 a.m.***

This session addresses abnormal SI combustion processes with a focus on spark knock. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation.

Organizers - *Terrence Alger, Southwest Research Institute; Richard S. Davis, General Motors LLC; Cinzia Tornatore, Istituto Motori CNR; John O. Waldman, General Motors LLC; Lurun Zhong, FCA US LLC*

Chairpersons - *John Waldman, General Motors LLC; Lurun Zhong, FCA US LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0659***	***A Statistical Description of Knock Intensity and Its Prediction*** *Jaal Ghandhi, University of Wisconsin; Kenneth Seonguk Kim, Army Research Laboratory*
8:30 a.m.	***2017-01-0667***	***Characteristic Time Analysis of SI Knock with Retarded Combustion Phasing in Boosted Engines*** *George Lavoie, Robert Middleton, Jason Martz, University of Michigan; Satheesh Makkapati, Eric Curtis, Ford Motor Company*
9:00 a.m.	***2017-01-0668***	***Pressure-Based Knock Measurement Issues*** *Arsham J. Shahlari, Jaal Ghandhi, University of Wisconsin*
9:30 a.m.	***2017-01-0669***	***Coupled Fluid-Solid Simulation for the Prediction of Gas-Exposed Surface Temperature Distribution in a SI Engine*** *Matthieu LEGUILLE, Frederic Ravet, Renault; Jerome Le Moine, Eric Pomraning, Keith Richards, P. K. Senecal, Convergent Science Inc.*
10:00 a.m.		***BREAK***

10:30 a.m.	***2017-01-0662***	***Significance of RON, MON, and LTHR for Knock Limits of Compositionally Dissimilar Gasoline Fuels in a DISI Engine*** *David Vuilleumier, Magnus SjÃ¶berg, Sandia National Laboratories*
11:00 a.m.	***2017-01-0664***	***Influence of Coolant Temperature and Flow Rate, and Air Flow on Knock Performance of a Downsized, Highly Boosted, Direct-Injection Spark Ignition Engine*** *Mohd Asif, Karl Giles, University of Bath; Andrew Lewis, Sam Akehurst, University Of Bath; Niall Turner, Jaguar Land Rover*
11:30 a.m.	***2017-01-0666***	***A Comparison of Four Methods for Determining the Octane Index and K on a Modern Engine with Upstream, Port or Direct Injection*** *Zhenbiao Zhou, Yi Yang, Michael Brear, Joshua Lacey, University of Melbourne; Thomas G. Leone, James E. Anderson, Michael H. Shelby, Ford Motor Company*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Abnormal SI Combustion (Knock) (Part 2 of 2)

Session Code: ***PFL213***

Room 251 B ***Session Time:*** ***1:30 p.m.***

This session addresses abnormal SI combustion processes with a focus on spark knock. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation.

Organizers - *Terrence Alger, Southwest Research Institute; Richard S. Davis, General Motors LLC; Cinzia Tornatore, Istituto Motori CNR; John O. Waldman, General Motors LLC; Lurun Zhong, FCA US LLC*

Chairpersons - *John Waldman, General Motors LLC; Lurun Zhong, FCA US LLC*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0661***	***Influence of Compression Ratio on High Load Performance and Knock Behavior for Gasoline Port-Fuel Injection, Natural Gas Direct Injection and Blended Operation in a Spark Ignition Engine*** *Michael Pamminger, James Sevik, Riccardo Scarcelli, Thomas Wallner, Argonne National Laboratory; Carrie Hall, Illinois Institute of Technology*
2:30 p.m.	***2017-01-0658***	***Literature Survey of Water Injection benefits on boosted Spark Ignited engines*** *Achint Rohit, Sridev Satpathy, Jeongyong Choi, John Hoard, University of Michigan; Gopichandra Surnilla, Mohannad Hakeem, Ford Motor Company*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0660***	***Water Injection to Enhance Performance and Emissions of a Turbocharged Gasoline Engine under High Load Condition*** *Arturo Iacobacci, Luca Marchitto, Gerardo Valentino, Istituto Motori, CNR. Napoli - IT*
4:00 p.m.	***2017-01-0663***	***Water Injection as an Enabler for Increased Efficiency at High-Load in a Direct Injected, Boosted, SI Engine*** *Jeremy Worm, Jeffrey Naber, Joel Duncan, Michigan Tech APS Labs; Sam Barros, William Atkinson, Nostrum Energy LLC*
4:30 p.m.	***ORAL ONLY***	***Understanding Chemistry-Specific Fuel Differences at a Constant RON in a Boosted SI Engine*** *James P. Szybist, Derek Splitter, Oak Ridge National Laboratory*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

High Efficiency IC Engines Concepts (Part 1 of 3)

Session Code: ***PFL170***

Room 251 C ***Session Time:*** ***8:00 a.m.***

This session focuses on technologies such as advanced and partially mixed combustion, cooled EGR boosting, ignition and direct injection technologies, pressure boosting, intelligent combustion, thermal efficiency, fully variable valvetrains, and other new and developing technologies. Papers focused on waste heat recovery technologies should be submitted to HX102/103.

Organizers - *Alessandro D'Adamo; Yichao Guo, Ford Motor Co., Ltd.; Mark Joseph Monohon, NGK Spark Plugs (USA) Inc.; Vasudha Patri, Argonne National Laboratory; David B. Roth, BorgWarner Inc.; James P. Szybist, Oak Ridge National Laboratory; Alok Warey, General Motors Global R & D*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0632***	***Development of a 1-liter Advanced Turbocharged Gasoline Direct Injection 3-Cylinder Engine*** *Chen Yang, Haiyuan Cheng, Zizhu fan, Jiandong Yin, Yuan Shen, Geely Powertrain Research Institute*
8:30 a.m.	***2017-01-0648***	***Dedicated EGR Vehicle Demonstration*** *Dennis Robertson, Christopher Chadwell, Terrence Alger, Southwest Research Institute; Jacob Zuehl, Briggs and Stratton Corp.; Raphael Gukelberger, Bradley Denton, Ian Smith, Southwest Research Institute*
9:00 a.m.	***2017-01-0646***	***Dynamic Downsizing Gasoline Demonstrator*** *Michael Bassett, Jonathan Hall, Tony Cains, Mark Underwood, MAHLE Powertrain Ltd.; Richard Wall, Aeristech Ltd.*
9:30 a.m.	***2017-01-0647***	***Design and Implementation of a D-EGRÂ® Mixer for Improved Dilution and Reformate Distribution*** *Bradley Denton, Christopher Chadwell, Raphael Gukelberger, Terrence Alger, Southwest Research Institute*
10:00 a.m.		***BREAK***
10:30 a.m.	***ORAL ONLY***	***Dynamic Skip Fire in Four-Cylinder Spark Ignition Engines: Fuel Economy Gains and Pollutant Emissions Reductions*** *Jerry Frank Fuschetto, Kian Eisazadeh-Far, Matthew Younkins, Steven Carlson, Tula Technology Inc.; Keith Confer, William Fedor, John Kirwan, Delphi Automotive*
11:00 a.m.	***2017-01-0640***	***A Variable Displacement Supercharger Performance Evaluation*** *Robert Wade, Steven Murphy, Ford Motor Company; Paul Cross, Craig Hansen, Hansen Engine Corporation*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

High Efficiency IC Engines Concepts (Part 2 of 3)

Session Code: ***PFL170***

Room 251 C ***Session Time:*** ***1:30 p.m.***

This session focuses on technologies such as advanced and partially mixed combustion, cooled EGR boosting, ignition and direct injection technologies, pressure boosting, intelligent combustion, thermal efficiency, fully variable valvetrains, and other new and developing technologies. Papers focused on waste heat recovery technologies should be submitted to HX102/103.

Organizers - *Alessandro D'Adamo; Yichao Guo, Ford Motor Co., Ltd.; Mark Joseph Monohon, NGK Spark Plugs (USA) Inc.; Vasudha Patri, Argonne National Laboratory; David B. Roth, BorgWarner Inc.; James P. Szybist, Oak Ridge National Laboratory; Alok Warey, General Motors Global R & D*

Time	Paper No.	Title
1:30 p.m.	2017-01-0639	**Fuel Economy Potential of Variable Compression Ratio for Light Duty Vehicles** *Michael H. Shelby, Thomas G. Leone, Kevin D. Byrd, Frank K. Wong, Ford Motor Company*
2:00 p.m.	2017-01-0634	**The 2-Step VCR Conrod System - Modular System for High Efficiency and Reduced CO2** *Schoeffmann Wolfgang, Helfried Sorger, Siegfried Loesch, Wolfgang Unzeitig, AVL LIST GmbH; Thomas Huettner, AVL Powertrain Engineering, Inc.; Alois Fuerhapter, AVL LIST GmbH*
2:30 p.m.	2017-01-0635	**DigitalAirâ„¢ Camless FVVA System â€“ Part 1, Valve Train Design, Capability and Performance** *Guy Babbitt, Jeff Rogers, Kristina Weyer, Drew Cohen, Czero Inc.; Stephen Charlton, JP SCOPE Inc.*
3:00 p.m.		**BREAK**
3:30 p.m.	2017-01-0641	**DigitalAir^{â„¢} Camless FVVA System - Part 2, Gasoline Engine Performance Opportunities** *Stephen J. Charlton, Charles E. Price, JP SCOPE, Inc.; Jeff Rogers, Czero Inc.; James W.G. Turner, Roshan S. Wijetunge, University Of Bath; William Anderson, Anderson Consulting*
4:00 p.m.	2017-01-0643	**Investigation of Early and Late Intake Valve Closure Strategies for Load Control in a Spark Ignition Ethanol Engine** *Thompson Lanzanova, Brunel University London; Macklini Dalla Nora, Federal University of Santa Maria; Hua Zhao, Brunel University London*
4:30 p.m.	2017-01-0642	**A Miller Cycle Engine without Compromise - The Magma Concept** *Richard Osborne, Ricardo UK Ltd.; Trevor Downes, Ricardo Innovations; Simon O'Brien, Ken Pendlebury, Ricardo UK Ltd.; Mark Christie, Ricardo Inc.*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Fuel Injection and Sprays (Part 3 of 8)

Session Code: ***PFL320***

Room 252 A ***Session Time:*** ***8:00 a.m.***

This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of both gasoline and diesel fuel sprays and fuel injection equipment are encouraged.

Organizers - *Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Shyam Menon, Louisiana State University; Michele Battistoni, Universita degli Studi di Perugia; Julien Manin, Sandia National Laboratories*

Chairpersons - *Noah Van Dam, Roberto Torelli, Argonne National Laboratory*

Time	Paper No.	Title

8:00 a.m.	***2017-01-0841***	***Numerical Study on Flash Boiling Spray of Multi-Hole Injector*** *Shiquan Shen, Zhizhao Che, Tianyou Wang, Tianjin University; Ming Jia, Dalian University of Technology; Kai Sun, Tianjin University*
8:30 a.m.	***2017-01-0834***	***Coupled Eulerian Internal Nozzle Flow and Lagrangian Spray Simulations for GDI Systems*** *Kaushik Saha, Argonne National Laboratory; Shaoping Quan, Convergent Science Inc.; Michele Battistoni, Universita degli Studi di Perugia; Sibendu Som, Argonne National Laboratory; P. K. Senecal, Eric Pomraning, Convergent Science Inc.*
9:00 a.m.	***2017-01-0837***	***A Comparison of Experimental and Modeled Velocity in Gasoline Direct-Injection Sprays with Plume Interaction and Collapse*** *Panos Sphicas, Imperial College London; Lyle M Pickett, Scott Skeen, Jonathan Frank, Sandia National Laboratories; Tommaso Lucchini, David Sinoir, Gianluca D'Errico, Politecnico di Milano; Kaushik Saha, Sibendu Som, Argonne National Laboratory*
9:30 a.m.	***2017-01-0836***	***Uncertainty Quantification of Direct Injection Diesel and Gasoline Spray Simulations*** *Hongjiang Li, Christopher Rutland, University of Wisconsin*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0829***	***Exploration of Turbulent Atomization Mechanisms for Diesel Spray Simulations*** *Gina M. Magnotti, Caroline L. Genzale, Georgia Institute of Technology*
11:00 a.m.	***2017-01-0838***	***The role of turbulent-chemistry interaction in simulating end-of-injection combustion transients in diesel sprays*** *Sayop Kim, Dorrin Jarrahbashi, Caroline Genzale, Georgia Institute of Technology*
11:30 a.m.	***2017-01-0842***	***Influence of Oxygen Concentration on the Auto-Ignition and Flame Propagation Characteristics of Diesel Spray with Experimental Comparison*** *Luis Bravo, Army Research Laboratory; Scott Ripplinger, Engility Corporation; Omid Samimi, Wayne State University*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Fuel Injection and Sprays (Part 4 of 8)

Session Code: ***PFL320***

Room 252 A ***Session Time:*** ***1:30 p.m.***

This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of both gasoline and diesel fuel sprays and fuel injection equipment are encouraged.

Organizers - *Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Shyam Menon, Louisiana State University; Michele Battistoni, Universita degli Studi di Perugia; Julien Manin, Sandia National Laboratories*

Chairpersons - *Michele Battistoni, Universita degli Studi di Perugia; Tarek Abdel-Salam, East Carolina University*

Time	***Paper No.***	***Title***

1:30 p.m.	***2017-01-0859***	***Computational and Experimental Investigation of Interfacial Area in Near-Field Diesel Spray Simulation*** *Adrian Pandal, Universidad de Oviedo; Jose M. Pastor, Raul Payri, Universitat Politecnica de Valencia; Alan Kastengren, Daniel Duke, Katarzyna Matusik, Jhoan S. Giraldo, Christopher Powell, Argonne National Laboratory; David Schmidt, University of Massachusetts*
2:00 p.m.	***2017-01-0848***	***Effects of cavitation and hydraulic flip in 3-hole GDI injectors*** *Mathis Bode, Tobias Falkenstein, Marco Davidovic, Heinz Pitsch, RWTH Aachen University; Hiroyoshi Taniguchi, Kei Murayama, Toshiyuki Arima, Honda R&D Co., Ltd.; Seoksu Moon, National Institute of AIST; Jin Wang, Argonne National Laboratory; Akira Arioka, Keihin Corp.*
2:30 p.m.	***ORAL ONLY***	***Investigating the near-nozzle spray region using highly-resolved simulations*** *Soumil Gurjar, Mario F. Trujillo, Univ. of Wisconsin*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0844***	***Evaluation and Validation of Large-Eddy-Simulation (LES) for Gas Jet and Sprays*** *Chi-Wei Tsang, University of Wisconsin; Yue Wang, Cheng Wang, Anthony Shelburn, Long Liang, Karthik Puduppakkam, Abhijit Modak, Chitralkumar Naik, Ellen Meeks, ANSYS Inc.; Christopher Rutland, University of Wisconsin*
4:00 p.m.	***2017-01-0852***	***Numerical study on evaporation of spherical droplets impinging on the wall using Volume of Fluid (VOF) model*** *Sathya Prasad Potham, Le Zhao, Seong-Young Lee, Michigan Technological University*
4:30 p.m.	***2017-01-0817***	***Unsteady Three-Dimensional Computations of the Penetration Length and Mixing Process of Various Single High-Speed Gas Jets for Engines*** *Remi Konagaya, Ken Naitoh, Kohta TSURU, Waseda University; Yasuo Takagi, Yuji Mihara, Tokyo City University*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Holistic Session on Fuel Consumption and Fuel Economy (Part 1 of 2)

Session Code: ***PFL370***

Room 252 B ***Session Time:*** ***8:00 a.m.***

The focus of this session is the performance of integrated vehicle systems and the influence of driving styles and drive cycles on fuel consumption/economy. This will include how integration of vehicle components such as the powertrain, parasitics, accessories, mass elements, aerodynamics, tires, brakes, and hubs affect the overall vehicle energy and energy conversion efficiency.

Organizers - *Patrick Phlips, Ford Motor Company; John Thomas, Brian West, Shean Huff, Oak Ridge National Laboratory; James Lyons, Sierra Research Inc.; Neeraj SHIDORE, General Motors LLC; Gregory Pannone, Novation Analytics*

Time	***Paper No.***	***Title***

8:00 a.m.	***2017-01-0894***	***Fuel Economy Variability Investigations: From Test Cells to Real World*** *Nishant Singh, Kenworth Division, PACCAR Inc.*
8:30 a.m.	***2017-01-0892***	***On-Road Validation of a Simplified Model for Estimating Real-World Fuel Economy*** *Eric Wood, Jeffrey Gonder, National Renewable Energy Laboratory; Forrest Jehlik, Argonne National Laboratory*
9:00 a.m.	***2017-01-0901***	***Comparison of vehicle-broadcasted fuel consumption rates against precise fuel measurements*** *Alex Pink, Adam Ragatz, Lijuan Wang, Eric Wood, Jeffrey Gonder, National Renewable Energy Laboratory*
9:30 a.m.	***2017-01-0903***	***Impact of Conventional and Electrified Powertrains on Fuel Economy in Various Driving Cycles*** *Sarp Mamikoglu, Jelena Andric, Petter Dahlander, Chalmers University of Technology*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0898***	***A Study of the Auxiliary Belt Drive System for Actual Fuel Saving*** *Jongwon Lee, Hyundai Motor Company; Sedoo Oh, Korea Automotive Technology Institute; Kyung Sub Joo, Gates Korea; Seyoung Yi, Kyoung-Pyo Ha, Seongbaek Joo, Hyundai Motor Company*
11:00 a.m.	***2017-01-0893***	***Reduction of Parasitic Losses in Front-End-Accessory-Drive Systems - Part 1*** *Marek Tatur, Kiran Govindswamy, Dean Tomazic, FEV North America Inc.*
11:30 a.m.	***2017-01-0896***	***Next-Generation Low-Voltage Power Nets - Impacts of Advanced Stop/Start and Sailing Functionalities*** *Philip Griefnow, Jakob Andert, VKA, RWTH Aachen University; Dejan Jolovic, FEV GmbH*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Holistic Session on Fuel Consumption and Fuel Economy (Part 2 of 2)

Session Code: ***PFL370***

Room 252 B ***Session Time:*** ***1:30 p.m.***

The focus of this session is the performance of integrated vehicle systems and the influence of driving styles and drive cycles on fuel consumption/economy. This will include how integration of vehicle components such as the powertrain, parasitics, accessories, mass elements, aerodynamics, tires, brakes, and hubs affect the overall vehicle energy and energy conversion efficiency.

Organizers - *Patrick Phlips, Ford Motor Company; John Thomas, Brian West, Shean Huff, Oak Ridge National Laboratory; James Lyons, Sierra Research Inc.; Neeraj SHIDORE, General Motors LLC; Gregory Pannone, Novation Analytics*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0899***	***Fleet-Level Modeling of Real World Factors Influencing Greenhouse Gas Emission Simulation in ALPHA*** *Paul Dekraker, John Kargul, Andrew Moskalik, Kevin Newman, Mark Doorlag, Daniel Barba, US Environmental Protection Agency*

2:00 p.m.	***2017-01-0895***	***Powertrain Efficiency in the US Fleet on Regulatory Drive Cycles and with Advanced Technologies*** *Patrick Phlips, Thomas Megli, Ford Motor Company*
2:30 p.m.	***2017-01-0897***	***Decomposing Fuel Economy and Greenhouse Gas Regulatory Standards in the Energy Conversion Efficiency and Tractive Energy Domain*** *Gregory Pannone, Brian Betz, Michael Reale, Novation Analytics; John Thomas, Oak Ridge National Laboratory*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0906***	***Modeling the Impact of Reducing Vehicle Greenhouse Gas Emissions with High Compression Engines and High Octane Low Carbon Fuels*** *Thomas L. Darlington, Air Improvement Resource Inc.; Gary A. Herwick, Transportation Fuels Consulting Inc.; Dennis Kahlbaum, Air Improvement Resource Inc.; Dean Drake, Defour Group LLC*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Multi-Dimensional Engine Modeling (Part 3 of 6)

Session Code: ***PFL120***

Room 258 ***Session Time:*** ***8:00 a.m.***

The session covers advances in the development and application of models and tools involved in multi-dimensional engine modeling: advances in chemical kinetics, combustion and spray modeling, turbulence, heat transfer, mesh generation, and approaches targeting improved computational efficiency. Papers employing multi-dimensional modeling to gain a deeper understanding of processes related to turbulent transport, transient phenomena, and chemically reacting, two-phase flows are also encouraged.

Organizers - *Hardo Barths, General Motors; Gianluca D'Errico, Politecnico di Milano; Stefano Fontanesi, Universita degli Studi di Modena; Daniel C. Haworth, Penn State Univ-University Park*

Chairpersons - *Tommaso Lucchini, Politecnico di Milano*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0561***	***Comparison of Linear, Non-Linear and Generalized RNG-Based k-epsilon Models for Turbulent Diesel Engine Flows*** *Federico Perini, University of Wisconsin-Madison; Kan Zha, Stephen Busch, Sandia National Laboratories; Rolf Reitz, University of Wisconsin-Madison*
8:30 a.m.	***2017-01-0547***	***Modeling of Reactive Spray Processes in DI Diesel Engines*** *Zvonimir Petranovic, University of Zagreb; Wilfried Edelbauer, AVL LIST GmbH; Milan VujanoviÄ‡, University of Zagreb; Peter Priesching, Reinhard Tatschl, AVL LIST GmbH; Neven DuiÄ‡, University of Zagreb*
9:00 a.m.	***2017-01-0548***	***Modeling Flash Breakup for a Direct-Injection Spark-Ignition Gasoline Engine*** *Taehoon Kim, Sungwook Park, Hanyang University*
9:30 a.m.	***ORAL ONLY***	***A Dynamic Large Eddy Model for Simulating Turbulent Reactive Flow in Engines using a Parallel adaptive Finite Element Method.*** *Jiajia Waters PhD, Los Alamos National Laboratory; David B. Carrington, Los Alamos National Lab.*

10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0549***	***Study of LES Quality Criteria in a Motored Internal Combustion Engine*** *Insuk Ko, Seoul National University; Alessandro D'Adamo, Stefano Fontanesi, Universita degli Studi di Modena; Kyoungdoug Min, Seoul National University*
11:00 a.m.	***2017-01-0575***	***Assessment of Large-Eddy Simulations of Turbulent Round Jets Using Low-Order Numerical Schemes*** *Zhiyan Wang, Purdue University; Muhsin M. Ameen, Sibendu Som, Argonne National Laboratory; John Abraham, San Diego State University*
11:30 a.m.	***2017-01-0577***	***An Insight on the Spray-A Combustion Characteristics by Means of RANS and LES Simulations Using Flamelet-Based Combustion Models*** *Bersan Akkurt, Hayri Yigit Akargun, L. M. T. Somers, N. G. Deen, Eindhoven University of Technology; Ricardo Novella, Eduardo Javier PÃ©rez-SÃ¡nchez, Universitat Politecnica de Valencia*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00578, and also individually. T purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Multi-Dimensional Engine Modeling (Part 4 of 6)

Session Code: ***PFL120***

Room 258 ***Session Time:*** ***1:30 p.m.***

The session covers advances in the development and application of models and tools involved in multi-dimensional engine modeling: advances in chemical kinetics, combustion and spray modeling, turbulence, heat transfer, mesh generation, and approaches targeting improved computational efficiency. Papers employing multi-dimensional modeling to gain a deeper understanding of processes related to turbulent transport, transient phenomena, and chemically reacting, two-phase flows are also encouraged.

Organizers - *Hardo Barths, General Motors; Gianluca D'Errico, Politecnico di Milano; Stefano Fontanesi, Universita degli Studi di Modena; Daniel C. Haworth, Penn State Univ-University Park*

Chairpersons - *Tommaso Lucchini, Politecnico di Milano*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0550***	***CFD-Guided Heavy Duty Mixing-Controlled Combustion System Optimization with a Gasoline-Like Fuel*** *Yuanjiang Pei, Yu Zhang, Praveen Kumar, Michael Traver, David Cleary, Aramco Research Center â€“ Detroit; Muhsin Ameen, Sibendu Som, Argonne National Laboratory; Daniel Probst, Tristan Burton, Eric Pomraning, P. K. Senecal, Convergent Science Inc.*
2:00 p.m.	***2017-01-0578***	***Numerical Investigation of a Gasoline-Like Fuel in a Heavy-Duty Compression Ignition Engine Using Global Sensitivity Analysis*** *Pinaki Pal, Argonne National Laboratory; Daniel Probst, Convergent Science Inc.; Yuanjiang Pei, Aramco Research Center; Yu Zhang, Aramco Services Co.; Michael Traver, Aramco Research Center; David Cleary, Aramco Services Co.; Sibendu Som, Argonne National Laboratory*

2:30 p.m.	***2017-01-0579***	***Advanced Methodology to Investigate Knock for Downsized Gasoline Direct Injection Engine Using 3D RANS Simulations*** *Stephane Chevillard, Olivier Colin, Julien Bohbot, IFP Energies Nouvelles, Institut Carnot IFPEN TE; Mingjie Wang, Eric Pomraning, P. K. Senecal, Convergent Science Inc.*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0551***	***Development of a RANS-Based Knock Model to Infer the Knock Probability in a Research Spark-Ignition Engine*** *Alessandro D'Adamo, Sebastiano Breda, Salvatore Iaccarino, Fabio Berni, Stefano Fontanesi, Barbara Zardin, Massimo Borghi, Universita degli Studi di Modena; Adrian Irimescu, Simona Merola, Istituto Motori CNR*
4:00 p.m.	***2017-01-0555***	***Numerical Simulation and Flame Analysis of Combustion and Knock in a DISI Optically Accessible Research Engine*** *Salvatore Iaccarino, Sebastiano Breda, Alessandro D'Adamo, Stefano Fontanesi, Universita di Modena e Reggio Emilia; Adrian Irimescu, Simona Merola, Istituto Motori CNR*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00578, and also individually. T purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Alternative Fuel and Fuel Additive Effects on SI Combustion Processes

Session Code: ***PFL214***

Room 259 ***Session Time:*** ***8:30 a.m.***

This session focuses on the impact of conventional and alternative fuels as well as fuel additives on the operation, performance and emissions of SI engines. Papers focus on the impact of bio-derived fuels (ethanol, butanol and others) on engine design and performance as well as gasoline properties and additives, and their impact.

Organizers - *Richard S. Davis, General Motors LLC; Toby Rockstroh, Argonne National Laboratory; James W G Turner, University Of Bath*

Chairpersons - *Toby Rockstroh, Argonne National Laboratory; William Attard, Fiat Chrysler Automobiles*

Time	***Paper No.***	***Title***
8:30 a.m.	***2017-01-0670***	***Effect of Syngas (H₂/CO) on SI Engine Knock under Boosted EGR and Lean Conditions*** *Taehoon Han, George Lavoie, Margaret Wooldridge, AndrÃ©Boehman, University of Michigan*
9:00 a.m.	***2017-01-0671***	***Effects of Fuel Laminar Flame Speed Compared to Engine Tumble Ratio, Ignition Energy, and Injection Strategy on Lean and EGR Dilute Spark Ignition Combustion*** *Christopher P. Kolodziej, Michael Pamminger, James Sevik, Thomas Wallner, Argonne National Laboratory; Scott W. Wagnon, William J. Pitz, Lawrence Livermore National Laboratory*
9:30 a.m.	***ORAL ONLY***	***Direct-injection internal combustion engine for high-pressure thermochemical recuperation - experimental study*** *Arnon Poran, Leonid Tartakovsky, Technion Israel Inst. of Technology*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

SI Combustion Ignition (Part 1 of 2)

Session Code: ***PFL215***

Room 259 ***Session Time:*** ***10:30 a.m.***

This session focuses on the SI combustion ignition process and advanced ignition systems. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation.

Organizers - *William P. Attard, Matthew Bresler, FCA US LLC; Ryan J. Chemiak, Richard S. Davis, General Motors LLC*

Chairpersons - *William Attard, Fiat Chrysler Automobiles; Simona Merola, Istituto Motori CNR*

Time	Paper No.	Title
10:30 a.m.	2017-01-0673	**Analysis of RF Corona Ignition in Lean Operating Conditions Using an Optical Access Engine** *Alessandro Cimarello, Carlo N. Grimaldi, Francesco Mariani, Michele Battistoni, Universita degli Studi di Perugia; Massimo Dal Re, Federal Mogul*
11:00 a.m.	2017-01-0674	**Calorimetry and Imaging of Plasma Produced by a Pulsed Nanosecond Discharge Igniter in EGR Gases at Engine-Relevant Densities** *Benjamin Matthew Wolk, Isaac Ekoto, Sandia National Laboratories*
11:30 a.m.	2017-01-0676	**Development of Ignition Technology for Dilute Combustion Engines** *Naoto Hayashi, Akimitsu Sugiura, Yuya Abe, DENSO Corporation; Kotaro Suzuki, Toyota Motor Corp.*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Powertrain NVH (Part 1 of 2)

Session Code: ***PFL550***

Room 259 ***Session Time:*** ***1:30 p.m.***

This session sets out to reflect the recent advances on the research, development and practices of Powertrain NVH treatment. The technical papers are of interest to powertrain system designers, testing specialists, NVH experts, and other individuals who evaluate and develop technologies to control powertrain NVH. The coverage includes: engine, engine subsystem and components noise and vibration; powertrain systems noise measurement and instrumentation; powertrain systems noise analysis.

Organizers - *Mikhail A. Ejakov, Ford Motor Company; Leonid Tartakovsky, Technion Israel Inst. of Technology; Gang Sheng Chen Sheng, Marshall University*

Time	Paper No.	Title
1:30 p.m.	2017-01-1058	**Application of Multiple Dynamic Vibration Absorbers to Reduce NVH Risks Caused by Alternative Half Shaft Design** *L.V. Pavan Kumar Maddula, Ibrahim Awara, Ford Motor Company*
2:00 p.m.	2017-01-1051	**Turbocharger First Order Synchronous Noise and Vibrations: Predictions and Measurements** *Hassan Nehme, Abdelkrim Zouani, Ford Motor Company*
2:30 p.m.	2017-01-1062	**Optimal Vanes Spacing for Improved NVH Performance of Variable Displacement Oil Pumps** *Abdelkrim Zouani, Gabriela Dziubinschi, Vidya Marri, Simon Antonov, Ford Motor Company*
3:00 p.m.		**BREAK**

3:30 p.m.	***2017-01-1060***	***Modeling of Dynamic Processes for Inertial Continuously Variable Transmissions***
		Sergei Aliukov, Andrei Keller, Alexander Alyukov, South Ural State University
4:00 p.m.	***2017-01-1056***	***An improved PID controller based on particle swarm optimization for active control engine mount***
		Rong Guo, Xiao-Kang Wei, Jun Gao, Tongji University
4:30 p.m.	***2017-01-1059***	***A Method of Acceleration Order Extraction for Active Engine Mount***
		Rong Guo, Jun Gao, Xiao-kang Wei, Tongji University

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Advanced Hybrid and Electric Vehicle Powertrains (Part 3 of 6)

Session Code: ***PFL710***

Room 260 Portside Ballroom ***Session Time:*** ***8:00 a.m.***

This session covers new production and near-production hybrid powertrains, hybrid architecture, and testing.

Organizers - *Michael Duoba, Argonne National Laboratory; Matthew Fleming, Ford Motor Co., Ltd.; Andrej Ivanco, Clemson-ICAR; Wiley R. McCoy, McLaren Performance Technologies; Constantine N. Raptis, GM Powertrain*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Evaluating the Validity of Electric Driving Potential Estimates Using Standard Test Methods and Utility Factors for PHEVs and BEVs.***
		Michael Duoba, Argonne National Laboratory
8:30 a.m.	***2017-01-1155***	***Estimation of the Effects of Auxiliary Electrical Loads on Hybrid Electric Vehicle Fuel Economy***
		Kevin Rhodes, Daniel Kok, Pallav Sohoni, Evan Perry, Marvin Kraska, Michael Wallace, Ford Motor Company
9:00 a.m.	***2017-01-1161***	***Improving Range Robustness: Heat Pump Value for Plug-In Electric Vehicles***
		Erik J. Christen, Tim Blatchley, Mark Jacobson, N Khalid Ahmed, Qiuming Gong, Ford Motor Company
9:30 a.m.	***2017-01-1146***	***Seasonality Effect on Electric Vehicle Miles Traveled in Electrified Vehicles***
		N. Khalid Ahmed, Jimmy Kapadia, Ford Motor Company
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1173***	***Development of Multi Stage Hybrid System for New Lexus Coupe***
		Shunya Kato, Ikuo Ando, Koji Ohshima, Tooru Matsubara, Yasuhiro Hiasa, Toyota Motor Corporation; Hideki Furuta, Yuma Mori, AISIN AW CO., LTD.
11:00 a.m.	***2017-01-1156***	***Development of Multi Stage Hybrid Transmission***
		Koichi Okuda, Yuji Yasuda, Masatoshi Adachi, Atsushi Tabata, Haruhisa Suzuki, Kiyonori Takagi, Toyota Motor Corporation; Tomoo Atarashi, Ryuta Horie, AISIN AW Co.,LTD.

11:30 a.m.	***2017-01-1150***	***Development of Shift Control System for Multi Stage Hybrid Transmission*** *Kenta Kumazaki, Tooru Matsubara, Nobufusa Kobayashi, Shunya Kato, Kazuyuki Shiiba, Ikuo Ando, Hiromichi Kimura, Hiroatsu Endo, Toyota Motor Corporation*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Advanced Hybrid and Electric Vehicle Powertrains (Part 4 of 6)

Session Code: ***PFL710***

Room 260 Portside Ballroom ***Session Time:*** ***1:30 p.m.***

This session covers new production and near-production hybrid powertrains, hybrid architecture, and testing.

Organizers - *Michael Duoba, Argonne National Laboratory; Matthew Fleming, Ford Motor Co., Ltd.; Andrej Ivanco, Clemson-ICAR; Wiley R. McCoy, McLaren Performance Technologies; Constantine N. Raptis, GM Powertrain*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-1164***	***Electrification Strategy for Larger Size Light-Duty Vehicles for Improvement of Fuel Economy and Cost Effectiveness*** *Zhe Huang, Masayuki Kita, Robert Cardno, DENSO International America Inc.*
2:00 p.m.	***2017-01-1158***	***Development of Electric Powertrain for New Model Hybrid Sports Utility Vehicle*** *Tomohiro fukazu, Yuhei Matsuo, Honda R&D Co., Ltd.*
2:30 p.m.	***2017-01-1163***	***Development of New Plug-In Hybrid System for Compact-Class Vehicle*** *Shinji Ichikawa, Hiroaki Takeuchi, Shigeru Fukuda, Shigeki Kinomura, Yoshiki Tomita, Yosuke Suzuki, Takahiko Hirasawa, Toyota Motor Corporation*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-1151***	***Development of New Plug-In Hybrid Transaxle for Compact-Class Vehicles*** *Yosuke Suzuki, Akiko Nishimine, Shinichi Baba, Kenji Miyasaka, Michitaka Tsuchida, Hiroatsu Endo, Norihiro Yamamura, Toyota Motor Corporation; Tomoyuki Miyazaki, NSK-Warner K.K.*
4:00 p.m.	***2017-01-1171***	***Factors Influencing Liquid over Air Cooling of High Voltage Battery Packs in an Electrified Vehicle*** *Sury Janarthanam, Neil Burrows, Bhaskara Rao Boddakayala, Ford Motor Company*
4:30 p.m.	***2017-01-1168***	***Methods of Measuring Regenerative Braking Efficiency in a Test Cycle*** *Zheng Liu, Walter J. Ortmann, Bernard Nefcy, Dan Colvin, Francis Connolly, Ford Motor Company*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Fatigue Modeling / Testing & CAE Durability Analysis (Part 3 of 6)

Session Code: ***M200***

Room 310 B ***Session Time:*** ***8:00 a.m.***

Topics discussed in this session focus on innovative and improved fatigue methodologies and problem-solving techniques on automotive components, assemblies, and vehicles based on material characterization, testing and CAE (Computer Aided Engineering) analysis.

Organizers - *Abolhassan Khosrovaneh, General Motors LLC; Guofei Chen, United States Steel Corp.; Carlos Carvalho Engler-Pinto, Ford Motor Co., Ltd.; Mingchao Guo, FCA US LLC; Zhigang Wei, Tenneco Inc.*

Chairpersons - *Guofei Chen, United States Steel Corp.*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0345***	***Influence of Hardness Variation and Defects on Fatigue Behavior of Automotive Steels*** *SungChul Cha, Hyundai Kefico; Seung-Hyun Hong, Hyundai Motor Co; Shahriar Sharifimehr, The University of Toledo*
8:30 a.m.	***2017-01-0343***	***A Structural Stress Recovery Procedure for Fatigue Life Assessment of Welded Structures*** *Xiao Wu, University of Michigan-Dearborn; Zhigang Wei, Tenneco Inc; HongTae Kang, University of Michigan; Abolhassan Khosrovaneh, General Motors LLC*
9:00 a.m.	***2017-01-0351***	***Failure Modeling of Adhesive Bonded Joints with Cohesive Elements*** *Guofei Chen, United States Steel Corporation; Mingchao Guo, FCA US LLC*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0349***	***Lifetime Assessment of Cylinder Heads for Efficient Heavy Duty Engines Part I: A Discussion on Thermomechanical and High-Cycle Fatigue as Well as Thermophysical Properties of Lamellar Graphite Cast Iron GJL250 and Vermicular Graphite Cast Iron GJV450*** *Thomas Seifert, Offenburg University of Applied Sciences; Philipp von Hartrott, Fraunhofer IWM; Kristopher Boss, Paul Wynthein, John Deere Engine Works*
10:30 a.m.	***2017-01-0346***	***Lifetime Assessment of Cylinder Heads for Efficient Heavy Duty Engines Part II: Component-Level Application of Advanced Models for Thermomechanical Fatigue Life Prediction of Lamellar Graphite Cast Iron GJL250 and Vermicular Graphite Cast Iron GJV450 Cylinder Heads*** *Radwan Hazime, ADACS Inc; Thomas Seifert, Offenburg University of Applied Sciences; Jeremy Kessens, Frank Ju, John Deere Engine Works*
11:00 a.m.	***2017-01-0355***	***Frequency FE-Based Weld Fatigue Life Prediction of Dynamic Systems*** *Edinilson Alves Costa, Ford Motor Company; Neil Bishop, CAEfatigue Ltd; Valdir Cardoso, Altair Engineering*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 5

Technical Expert Panel Discussion: Durability Analysis in CAE

Session Code: ***M200***

Room 310 B ***Session Time:*** ***1:00 p.m.***

The purpose of the panel is to provide an opportunity to discuss, clarify, evaluate and exchange of viewpoints among the automotive fatigue/durability experts. The state-of-the-art technologies in load, stress and fatigue damage analyses and their applications to engineering design for durability will be addressed.

Organizers - *Yung-Li Lee, FCA US LLC*

Moderators - *Abolhassan Khosrovaneh, General Motors LLC*

Panelists - *Abolhassan Khosrovaneh, General Motors LLC; Xuming Su, Ford Motor Co., Ltd.; Efthimio Duni, FCA EMEA; Yung-Li Lee, FCA US LLC;*

Time	Paper No.	Title
	ORAL ONLY	***Learn more about the panelists*** *Abolhassan Khosrovaneh, General Motors LLC; Xuming Su, Ford Motor Co., Ltd.; Efthimio Duni, FCA EMEA; Yung-Li Lee, FCA US LLC*

Wednesday, April 5

Fatigue Modeling / Testing & CAE Durability Analysis (Part 4 of 6)

Session Code: ***M200***

Room 310 B ***Session Time:*** ***1:00 p.m.***

Topics discussed in this session focus on innovative and improved fatigue methodologies and problem-solving techniques on automotive components, assemblies, and vehicles based on material characterization, testing and CAE (Computer Aided Engineering) analysis.

Organizers - *Abolhassan Khosrovaneh, General Motors LLC; Guofei Chen, United States Steel Corp.; Carlos Carvalho Engler-Pinto, Ford Motor Co., Ltd.; Mingchao Guo, FCA US LLC; Zhigang Wei, Tenneco Inc.*

Chairpersons - *Carlos Carvalho Engler-Pinto, Ford Motor Company*

Time	Paper No.	Title
1:00 p.m.	***Panel***	***Technical Expert Panel Discussion: Durability Analysis in CAE*** *The purpose of the panel is to provide an opportunity to discuss, clarify, evaluate and exchange of viewpoints among the automotive fatigue/durability experts. The state-of-the-art technologies in load, stress and fatigue damage analyses and their applications to engineering design for durability will be addressed.* *Learn more about the panelists* ***Organizers -*** *Yung-Li Lee, FCA US LLC* ***Moderators -*** *Abolhassan Khosrovaneh, General Motors LLC* ***Panelists -*** *Abolhassan Khosrovaneh, General Motors LLC; Xuming Su, Ford Motor Co., Ltd.; Efthimio Duni, FCA EMEA; Yung-Li Lee, FCA US LLC;*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0357***	***Fatigue Life Prediction of Induction Hardened Case Depth Specimens Made From 38MnVS6 Micro Alloyed Steel*** *Dattaprasad Lomate, Bharat Forge, Ltd.; Asim Tewari, IIT Bombay; Prashant Date, Indian Institute of Technology-Bombay; Manoj R Ukhande, Girish M Shegavi, Raj Kumar Prasad Singh, Bharat Forge Ltd*

3:30 p.m.	***2017-01-0327***	***Fatigue Analysis of Continuously Carbon Fiber Reinforced Laminates*** *Christian Gaier, Stefan Fischmeister, Magna Engineering Center Steyr GmbH&CoKG; Julia Maier, Gerald Pinter, University Leoben*
4:00 p.m.	***2017-01-0328***	***The Study on Fatigue Test of Cab Assembly Based on 4-Channel Road Simulation Bench*** *Yunkai Gao, Genhai Wang, Jingpeng Han, Tongji University*
4:30 p.m.	***2017-01-0334***	***Analysis on Fatigue Load and Life about the Frame of a Low-Speed Electric Vehicle Based on Multi-Body Dynamics*** *Yuexing Duan, Tongji University; Wei Huang, Guangxi University; Yunkai Gao, Jingpeng Han, Tongji University*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 5

Reliability and Robust Design in Automotive Engineering: Reliability and Robust Design in Automotive Aero-Thermal and Fluid Systems (Part 1 of 2)

Session Code: ***IDM105***

Room 311 A ***Session Time:*** ***8:00 a.m.***

The purpose of this session is to bring awareness among the automotive aerodynamics, thermal and hydraulic systems development community to address the need of reliability analysis and robust design to improve the overall product quality. This session also introduces CAE based optimization of aero-thermal and fluid systems to improve automotive fuel economy. This session presents papers covering both testing and simulation.

Organizers - *Richard L. Sun, Lawrence Technological Univ.; Alaa El-Sharkawy, FCA US LLC; David A. Lamb, US Army TARDEC; Sadek S. Rahman, FCA US LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***~~2017-01-0211~~*** ***ORAL ONLY***	***Measurement of the convective heat-transfer Coefficients for Under-Hood and Underbody Components*** *Alaa El-Sharkawy, Ahmed Uddin, FCA US LLC; Avik Chakravarty, Wayne State Univ.*
8:30 a.m.	***~~2017-01-0217~~*** ***ORAL ONLY***	***Simulation of the Effect of Altitude and Rotational Speed on Transient Temperatures of Rotating Components*** *Alaa El-Sharkawy, FCA US LLC; Abd El-Rahman Ali Hekal, Optumatics LLC; Dipan P. Arora, FCA US LLC; Amr Gamal Sami, Optumatics LLC*
9:00 a.m.	***2017-01-0214***	***Optimal Parameter Calibration for Physics Based Multi-Mass Engine Model*** *Simon O. Omekanda, FCA US LLC; Rezwanur Rahman, Detroit Engineering Product (DEP); Eric M. Lott, Sadek S. Rahman, Daniel E. Hornback, FCA US LLC*
9:30 a.m.		***BREAK***
10:30 a.m.	***2017-01-0215***	***Light Duty Truck Rear Axle Thermal Modeling*** *Mohammad Nahid, Detroit Engineering Product (DEP); Amin Sharfuzzaman, Altair Product Design; Joydip Saha, FCA US LLC; Harry Chen, Detroit Engineering Product (DEP); Sadek S. Rahman, FCA US LLC*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Wednesday, April 5

Reliability and Robust Design in Automotive Engineering: Reliability and Robust Design in

Automotive Aero-Thermal and Fluid Systems (Part 2 of 2)

Session Code: ***IDM105***

Room 311 A ***Session Time:*** ***1:00 p.m.***

The purpose of this session is to bring awareness among the automotive aerodynamics, thermal and hydraulic systems development community to address the need of reliability analysis and robust design to improve the overall product quality. This session also introduces CAE based optimization of aero-thermal and fluid systems to improve automotive fuel economy. This session presents papers covering both testing and simulation.

Organizers - *Richard L. Sun, Lawrence Technological Univ.; Alaa El-Sharkawy, FCA US LLC; David A. Lamb, US Army TARDEC; Sadek S. Rahman, FCA US LLC*

Time	Paper No.	Title
1:00 p.m.	2017-01-0212	**Lumped Parameter Based Thermo-Physical Modeling Of Electrified Vehicle Transmission System** *Mohammad Nahid, Rezwanur Rahman, Tabassum Hossainy, Shreyas Kapatral, Detroit Engineered Products (DEP) Inc.; Prashant Modi, Joydip Saha, Sadek S. Rahman, FCA US LLC*
1:30 p.m.	2017-01-0216	**Model Based Engineering Using Model.CONNECT** *Joydip Saha, FCA US LLC; Harshit Coutinho, AVL Powertrain Engineering Inc.; Sadek S. Rahman, FCA US LLC*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Wednesday, April 5

Modeling and Simulation of Military Ground Vehicles (Part 1 of 4)

Session Code: ***IDM201***

Room 311 B ***Session Time:*** ***8:00 a.m.***

The complexity and cost of military ground vehicles render them ideal candidates for a system-level modeling and simulation environment. This session will serve as a technical forum to address the practical challenges, current gaps, and emerging technologies related to modeling and simulation of military ground vehicles.

Organizers - *Denise M. Rizzo, Matthew Castanier, US Army TARDEC*

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	**Analysis and Design of Heat Exchangers for Military Ground Vehicles** *Michael Stoia, Boeing Co.*
8:30 a.m.	2017-01-0259	**Optimization of a Military Ground Vehicle Engine Cooling System Heat Exchanger - Modeling and Size Scaling** *Xinran Tao; John R. Wagner, Clemson University*
9:00 a.m.	ORAL ONLY	**Method for Modeling Fan Performance Characteristics for Military Ground Vehicles** *Scott Shurin, Ian Barber-Stranaly, Yeefeng Ruan PhD, US Army TARDEC*
9:30 a.m.		**BREAK**
10:00 a.m.	2017-01-0266	**A Thermal Bus for Vehicle Cooling Applications - Design and Analysis** *Shervin Shoai Naini, Junkui (Allen) Huang, Richard Miller, John R. Wagner, Clemson University; Denise Rizzo, Scott Shurin, US Army TARDEC; Katherine Sebeck, TARDEC*

10:30 a.m.	***2017-01-0260***	***Computationally-Efficient Heat Convection Model for Electric Machines*** *Yuanying Wang, Heath Hofmann, University of Michigan; Denise Rizzo, Scott Shurin, US Army TARDEC*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Wednesday, April 5

Modeling and Simulation of Military Ground Vehicles (Part 2 of 4)

Session Code: ***IDM201***

Room 311 B ***Session Time:*** ***1:00 p.m.***

The complexity and cost of military ground vehicles render them ideal candidates for a system-level modeling and simulation environment. This session will serve as a technical forum to address the practical challenges, current gaps, and emerging technologies related to modeling and simulation of military ground vehicles.

Organizers - *Denise M. Rizzo, Matthew Castanier, US Army TARDEC*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-0271***	***Optimal Power Management of Vehicle Sourced Military Outposts*** *Robert Jane, Gordon G. Parker, Wayne Weaver, Ronald Matthews, Michigan Technological University; Denise Rizzo, US Army TARDEC; Michael Cook, Michigan Technological University*
1:30 p.m.	***2017-01-0272***	***Powerpack Design in S-HEV: Quantifying the Influence of Duty Cycles on Design and Fuel Economy*** *Andrej Ivanco, Clemson-ICAR*
2:00 p.m.	***2017-01-0274***	***Computationally Efficient Li-Ion Battery Aging Model for Hybrid Electric Vehicle Supervisory Control Optimization*** *Xueyu Zhang, Zoran Filipi, Clemson-ICAR*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0268***	***Lightweight Stiffening Ribs in Structural Plates*** *Venkatesh Babu, US Army; Richard Gerth, US Army TARDEC*
3:30 p.m.	***2017-01-0270***	***What Is a Ton of Weight Worth? A Discussion of Military Ground System Weight Considerations*** *Richard Gerth, US Army TARDEC; Ryan Howell, US Army PEO GCS*
4:00 p.m.	***2017-01-0257***	***Integrated Effects of Active Suspension and Rear-Wheel Steering Control Systems on Vehicle Lateral Stability*** *Liang Wu, Fangwu Ma, Yongfeng Pu, HongBin Yin, Jilin University Automotive Engrg College*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Wednesday, April 5

Augmented Reality and Virtual Reality (AR/VR) Applications

Session Code: ***IDM301***

Room 312 A ***Session Time:*** ***8:00 a.m.***

Once largely a subject of science fiction speculation, virtual reality is increasingly finding real-world applications in industry. This session will focus on uses of augmented reality/virtual reality (AR/VR), immersive visualization, virtual testing, and other tools to support all phases of product design and development, as well as manufacturing, ergonomics, serviceability, and safety.

Organizers - *David Elijah Palmer, Bombardier Recreational Product Inc.; Marty Smets, Ford Motor Company*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Improve Parts Replenishment in Manufacturing Using Augmented Reality and Smart Eyewear*** *Randy Nunez, Nandakumar Rajamanickam, Matthew Biji, Mark Lapham, Karlene Patterson, Ford Motor Company*
8:30 a.m.	***ORAL ONLY***	***Enhancing the End-Of-Line Repair Process Using Augmented Reality*** *Randy Nunez, Aris Janitens, Kevin Mack, Nandakumar Rajamanickam, Christian Clark, Ford Motor Company*
9:00 a.m.	***2017-01-0278***	***Augmented Reality for Improved Dealership User Experience*** *John Kelly Villota Pismag, Hisham Alawneh, Cristian Adam, Samir A. Rawashdeh, University of Michigan - Dearborn; Pramita Mitra, Yifan Chen, Gary Strumolo, Ford Motor Company*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Wednesday, April 5

Business Modeling/Operation Research/Big Data Analytics (Part 3 of 4)

Session Code: ***IDM110***

Room 312 B ***Session Time:*** ***8:00 a.m.***

Business Modeling/Operation Research/Big Data Analytics are key enablers for the next wave of innovation and growth across most industries and will address complex issues and systems that involve multiple objectives, alternatives, trade-offs, and large amounts of data and situations involving uncertainty or risk. This session will address new technical advances in these areas and provide valuable insights through the applications of real-world case studies.

Organizers - *Zhen Jiang, Yan Fu, Ford Motor Company; Ramakrishna Koganti, Ramk Inc.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0245***	***Gain Customer Insights Using NLP Techniques*** *Kanna Akella, N. Venkatachalam, K. Gokul, Keunho Choi, Ramachandraprabhu Tyakal, Ford Motor Company*
8:30 a.m.	***2017-01-0243***	***Analyzing Customer Preference to Product Optional Features in Supporting Product Configuration*** *Zhenghui Sha, University of Arkansas; Veronica Saeger, Los Alamos National Laboratory; Mingxian Wang, Yan Fu, Ford Motor Company; Wei Chen, Northwestern University*
9:00 a.m.	***2017-01-0247***	***Big Data Analytics: How Big Data is Shaping Our Understanding of Electrified Vehicle Customers*** *N. Khalid Ahmed, Jimmy Kapadia, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0235***	***Customer Data Driven PHEV Refuel Distance Modeling and Estimation*** *Qiuming Gong, Jimmy Kapadia, Ford Motor Company*

10:30 a.m.	***2017-01-0238***	***Predictive Analytics in Automobile Industry: A Comparison between Artificial Intelligence and Econometrics*** *Velappan Shalini, Sridharan Krishnamurthy, Srinivasan Narasimhan, Ford Motor Company*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Wednesday, April 5

Business Modeling/Operation Research/Big Data Analytics (Part 4 of 4)

Session Code: ***IDM110***

Room 312 B ***Session Time:*** ***1:00 p.m.***

Business Modeling/Operation Research/Big Data Analytics are key enablers for the next wave of innovation and growth across most industries and will address complex issues and systems that involve multiple objectives, alternatives, trade-offs, and large amounts of data and situations involving uncertainty or risk. This session will address new technical advances in these areas and provide valuable insights through the applications of real-world case studies.

Organizers - *Zhen Jiang, Yan Fu, Ford Motor Company; Ramakrishna Koganti, Ramk Inc.*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-0240***	***A Cost-Effective Offline Routing Optimization Approach to Employee Shuttle Services*** *Yanli Zhao, Hao Zhou, Yimin Liu, Ford Motor Company*
1:30 p.m.	***ORAL ONLY***	***MDrive Electric Car Share Program*** *Michael Douglas Bima, DENSO International America Inc.*
2:00 p.m.	***2017-01-0248***	***Engineering Productivity Increase with Organization Architectures*** *Fabian Jorg Uwe Koark, INVENSITY Inc.; Arvind Korandla, INVENSITY GmbH*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0234***	***Real Time Data Tagging Software(RT-DTS)*** *Assam Alzookery, DENSO International America Inc.*

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Wednesday, April 5

Design Optimization - Methods and Applications (Part 3 of 3)

Session Code: ***SS103***

Room 313 A ***Session Time:*** ***8:00 a.m.***

Design Optimization Methods and Application session features presentations on new and improved optimization techniques and on application of different optimization methods in component and vehicle design. Methods include deterministic and stochastic optimization techniques. Applications range from noise pressure optimization and vehicle dynamic response optimization to sub-system topology and shape and full vehicle gage and topology optimization.

Organizers - *Mallikarjuna Bennur, Chandan Mozumder, Vesna Savic, General Motors LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Geometric Design Optimization of BLDC Starter Motor*** *Venkata Raghunath K. Rachabattuni, TVS Motor Co., Ltd.; Samraj Jabez Dhinagar, TVS Motor Co Ltd*

8:30 a.m.	***2017-01-1341***	***Development of Methodology for Full Bus Body Optimisation and Strengthening by Numerical Simulation*** *Alok Kumar, VE Commercial Vehicles, Ltd..; Sandeep Sharma, Volvo Group*
9:00 a.m.	***2017-01-1336***	***Topology Optimization and Fatigue Analysis for Lightweight Design of Vehicle Differential Case*** *Waqas Shaikh, Liangmo Wang, Sen Yang, Nanjing University of Science & Technology; Hanguan Xia, Yi Dong, Jiangsu Pacific Forging Tech Co., Ltd.*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1309***	***Modular Design and Methods to Optimize Seat Complete Assemblies*** *S. M. Akbar Berry, Ford Motor Company; Hoda ElMaraghy, University of Windsor; Johnathan Line, Marc Kondrad, Ford Motor Company*
10:30 a.m.	***2017-01-1308***	***Design of Roof Rack Rails with Cost and Weight Optimization*** *Abhishek Softa, Anuj Shami, Rajdeep Singh Khurana, Maruti Suzuki India Ltd*

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Integrated Computational Materials Engineering (ICME) (Part 1 of 3)

Session Code: ***IDM109***

Room 313 A ***Session Time:*** ***1:00 p.m.***

ICME is an emerging discipline to address foundational engineering problems with the integration of predictive tools and methods that model and simulate materials & product design, manufacturing processes, local materials properties and component performance. This session will address new developments and practical applications of ICME for metallic, polymeric and composite material systems in automotive industry.

Organizers - *Hongyi Xu, Yang Li, Ford Motor Company; Qigui Wang, General Motors LLC; Mei Li, Ford Motor Company; Alan Luo, Ohio State University*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-0226***	***Integrated Computational Materials Engineering (ICME) Multi-Scale Model Development for Advanced High Strength Steels*** *Vesna Savic, Louis Hector, General Motors LLC; Ushnish Basu, Anirban Basudhar, Imtiaz Gandikota, Nielen Stander, Livermore Software Technology Corp; Taejoon Park, Farhang Pourboghrat, Ohio State University; Kyoo Sil Choi, Xin Sun, Pacific Northwest National Laboratory; Jun Hu, Fadi Abu-Farha, Clemson University; Sharvan Kumar, Brown University*
1:30 p.m.	***2017-01-0225***	***Compression Behavior of DIN C10C and SAE-AISI 1010 Steels During Riveting of Clutch Disc Spacer Bolts: Experimental and Computational Analysis*** *Gabriela Guerra, LuK Puebla; Ulises Figueroa-LÃ³pez, Andrea Guevara-Morales, Tec de Monterrey*
2:00 p.m.	***2017-01-0227***	***Influence of Materials Properties on Process Planning Effectiveness*** *Omar Al-Shebeeb, Bhaskaran Gopalakrishnan, West Virginia University*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Wednesday, April 5

Reliability and Robust Design in Automotive Engineering: Reliability and Accelerated

Testing (Part 1 of 2)

Session Code: ***IDM103***

Room 313 B ***Session Time:*** ***8:00 a.m.***

This session presents methods and applications of assessing reliability in product development Topics include reliability target allocation, vehicle reliability, combined environment tests, integration of reliability tests with CAE/simulation, integration of failure modes and effects analysis, statistical considerations in accelerated tests, life data analysis, reliability growth analysis and information limits in reliability assessment.

Organizers - *Paul Lubinski, Thermo King Corp.; Huairui Guo, Yung-Li Lee, FCA US LLC; Mark A. Pompetzki, HBM-nCode*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0201***	***Reproducibility of Automotive Tests Using Rescaled Range Analysis*** *Tejas Janardan Sarang, Amar Phatak, AMP Engineering Design Ventures; Jay Bendkhale, AMP Engineering Design Ventures LLP*
8:30 a.m.	***2017-01-0204***	***Customer Usage Space Classification and Representative Duty Cycle Development Using K-Means Clustering*** *Gaurav Gosain, Billy Holland, Thomas McKinley, Cummins Inc*
9:00 a.m.	***2017-01-0200***	***A New Method to Accelerate Road Test Simulation on Multi-Axial Test Rig*** *Hongwei Zhang, Liangjin Gui, Zijie Fan, Tsinghua University*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0199***	***A Method for Rapid Durability Test Development*** *Harpreet Grewal, Anthony D'Amato, Kathleen Rossie, Ford Motor Company*
10:30 a.m.	***ORAL ONLY***	***Virtual Road Load Data*** *Prashant Khapane, Jaguar Land Rover*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Wednesday, April 5

Reliability and Robust Design in Automotive Engineering: Reliability and Accelerated Testing (Part 2 of 2)

Session Code: ***IDM103***

Room 313 B ***Session Time:*** ***1:00 p.m.***

This session presents methods and applications of assessing reliability in product development Topics include reliability target allocation, vehicle reliability, combined environment tests, integration of reliability tests with CAE/simulation, integration of failure modes and effects analysis, statistical considerations in accelerated tests, life data analysis, reliability growth analysis and information limits in reliability assessment.

Organizers - *Paul Lubinski, Thermo King Corp.; Huairui Guo, Yung-Li Lee, FCA US LLC; Mark A. Pompetzki, HBM-nCode*

Time	Paper No.	Title
1:00 p.m.	***2017-01-0202***	***Accelerated Reliability Demonstration Methods Based on Three-Parameter Weibull Distribution*** *Zhigang Wei, Raghuram Mandapati, Ranjith Nayaki, Jason Hamilton, Tenneco Inc.*
1:30 p.m.	***2017-01-0197***	***A Methodology for Fatigue Life Estimation of Linear Vibratory Systems under Non-Gaussian Loads*** *Vasiliki Tsianika, Vasileios Geroulas, Zissimos Mourelatos, Oakland University; Igor Baseski, TARDEC*

2:00 p.m.	***2017-01-0198***	***EV Charge Station System Reliability Modeling and Analysis*** *Jiliang Zhang, Carolyn Wozniak, Tesla Motors*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Wednesday, April 5

Safety-Critical Systems (Part 3 of 3)

Session Code: ***AE403***

Room 320 ***Session Time:*** ***8:00 a.m.***

The focus of the session is on system safety analysis and design of safety-critical systems employing electronic controls. Topics include: implementation of safety-relevant systems, fail-safe strategies, distributed fault tolerant systems and hazard analysis. Application areas include: automotive active safety and alternative energy systems as well as avionics and mission management. Finally, the session addresses application of new or revised safety standards such as ISO 26262 and DO-178C.

Organizers - *Barbara J. Czerny, ZF - TRW; Joseph G. D'Ambrosio, GM R&D Center; Brian T. Murray, ZF - TRW; Markus Plankensteiner, TTTech. Computertechnik AG*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0064***	***Managing Functional Safety (ISO26262) in Projects*** *Agish George, Jody Nelson, KVA*
8:30 a.m.	***2017-01-0060***	***On the Impact of the Second Edition of the ISO 26262 on Model-Based Development of Safety-Related Systems*** *Heiko Doerr, Thomas End, Lena Kaland, Model Engineering Solutions GmbH*
9:00 a.m.	***2017-01-0058***	***Integrating STPA into ISO 26262 Process for Requirement Development*** *Dajiang Suo, Ford Motor Company, MIT; Sarra Yako, Mathew Boesch, Kyle Post, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0056***	***A Method towards the Systematic Architecting of Functionally Safe Automated Driving- Leveraging Diagnostic Specifications for FSC design*** *Naveen Mohan, Martin TÃ¶rngren, Sagar Behere, KTH Royal Institute of Technology*
10:30 a.m.	***2017-01-0059***	***Foreseeable Misuse in Automated Driving Vehicles - The Human Factor in Fatal Accidents of Complex Automation*** *Barbaros Serter, INVENSITY Inc.; Christian Beul, Manuela Lang, Wiebke Schmidt, Invensity GmbH*
11:00 a.m.	***ORAL ONLY***	***A Design Strategy of Fault Tolerant System in AUTOSAR 4.x Based ECU Network.*** *Jinhyuk Jung, Euntai Kim, Yonsei Univ*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Wednesday, April 5

Technical Expert Panel Discussion: Vehicle Cybersecurity and the IoT

Session Code: ***AE299***

Room 320 ***Session Time:*** ***1:00 p.m.***

A variety of attacks were demonstrated by researchers in the last years ranging from attacks that have the potential to modify the vehicleâ€™s behavior to unlocking doors and stealing a vehicle. These attacks target vehicle systems and in some cases vulnerabilities of smart-phone apps. This panel addresses the complexity around vehicle cybersecurity, how vehicle cybersecurity relates to IoT cybersecurity, what security projects and standardization efforts are on-going, and what gaps are remaining.

Organizers - *Gloria D'Anna, General Telecom Systems Inc.; Andre Weimerskirch, Lear Corporation*

Moderators - *Gloria D'Anna, General Telecom Systems Inc.*

Panelists - *Russ Bielawski, University of Michigan; Justin Cappos, New York University; Faye Francy, Auto-ISAC; Kevin Harnett, DOT/Volpe Center; Dan Massey, Dept Of Homeland Security; Brian T. Murray, ZF - TRW; Andre Weimerskirch, Lear Corporation;*

Wednesday, April 5

Cybersecurity for Cyber-Physical Vehicle Systems (Part 1 of 3)

Session Code: ***AE202***

Room 320 ***Session Time:*** ***3:30 p.m.***

This session focuses on cybersecurity for cyber-physical vehicle systems. Topics include: design, development and implementation of security-critical cyber-physical vehicle systems, cybersecurity design, development, and implementation strategies, analysis methodologies, process and life-cycle management, comparisons of system safety and cybersecurity, etc. Application areas include: security-critical automotive systems as well as other security-critical ground vehicle and aviation systems.

Organizers - *Amit Choudhury, TRW Automotive; Mohammad Naserian, General Motors LLC; Barbara J. Czerny, Brian T. Murray, ZF - TRW; David Ward, Horiba Mira, Ltd.*

Time	Paper No.	Title
3:30 p.m.	ORAL ONLY	**Technical Keynote: Automotive Cybersecurity â€“ Next Challenges and Approaches** *Andre Weimerskirch, Lear Corporation*
4:00 p.m.	2017-01-1652	**Cyber Security in the Automotive Domain â€“ An Overview** *Rolf Schneider, Andre Kohn, AUDI AG; Martin Klimke, Udo Dannebaum, Infineon Technologies AG*
4:30 p.m.	ORAL ONLY	**Threat and Operability Analysis - a Proposed Threat Identification Method** *Barbara J. Czerny, ZF - TRW*
5:00 p.m.	2017-01-1661	**Integrated Safety and Security Development in the Automotive Domain** *Georg Macher, AVL List GmbH; Richard Messnarz, I.S.C.N. GesmbH/LTD; Eric Armengaud, AVL List GmbH; Andreas Riel, Grenoble Institute of Technology; Eugen Brenner, Christian Kreiner, Graz University of Technology*

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Wednesday, April 5

Driver Assistance Systems: Algorithms, Applications and Electronic Sensing (Part 3 of 3)

Session Code: ***AE401***

Room 321 ***Session Time:*** ***8:00 a.m.***

Advanced Driver Assistance Systems (ADAS) are gaining major importance all vehicle segments. The effectiveness of these systems is based upon the ability to not only sense the outside world and the ability to use the information intelligently. In this one-day session the sensing technologies and systems will be covered in the morning and the algorithms and applications will be discussed in the afternoon.

Organizers - *Yixin Chen, Changan US R & D; Ting Huang, Parker; Feilong Liu, General Motors; Scott Piper, General Motors LLC; Sara Dadras, Ford Motor Company*

Time	Paper No.	Title
8:00 a.m.	**2017-01-0027**	***Yaw Rate Based Trailer Hitch Angle Estimation for Trailer Backup Assist***
		Li Xu, Eric Tseng, Thomas Pilutti, Steven Schondorf, Ford Motor Company
8:30 a.m.	**2017-01-0040**	***Control for Automated Trailer Backup***
		Michael Hafner, Thomas Pilutti, Ford Motor Company
9:00 a.m.	**2017-01-0036**	***Low-Speed Longitudinal Distance Control with Applications to Parking***
		Michael Hafner, John Bales, Ford Motor Company
9:30 a.m.		***BREAK***
10:00 a.m.	**2017-01-0038**	***Changing Habits to Improve Fuel Economy***
		Corwin Stout, Milos Milacic, Fazal Syed, Ming Kuang, Ford Motor Company
10:30 a.m.	**2017-01-0033**	***Baseline Analysis of Driver Performance at Intersections for the Left-Turn Assist Application***
		Scott Stevens, Jeffrey Bellone, Philip Azeredo, Marisol Medri, USDOT Volpe Center
11:00 a.m.	**2017-01-0032**	***A Trajectory Planning and Fuzzy Control for Autonomous Intelligent Parking System***
		Wei Yang, Ling Zheng, Yinong Li, Yue Ren, Chongqing University; Yusheng Li, Changan Automobile Engineering Institute
11:30 a.m.	**2017-01-0041**	***The Research of the Adaptive Front Lighting System Based on GIS and GPS***
		Shengguang Xiong, Gangfeng Tan, Xuexun Guo, Longjie Xiao, Wuhan University of Technology

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Wednesday, April 5

System Prognostics

Session Code: ***AE204***

Room 321 ***Session Time:*** ***1:00 p.m.***

Prognostics is an engineering discipline focused on predicting the time at which a system or a component will no longer perform its intended function. What is the value of predicting failure? How do you select the right information to create an algorithm? How do you test an algorithm to make sure you are predicting failures properly? This session will explore new algorithms to catch anomalies on various automotive systems. Catching the failure before it happens is the key. Meet the experts.

Organizers - *Tim A. Cavanaugh, Cavanaugh Consulting; Chirag Sonchal, Tata Consultancy Services*

Time	Paper No.	Title
1:00 p.m.	**2017-01-1625**	***Machine Health Prediction Enhancement Using Machine Learning***
		Rajeev Kalamdani, Chandra Jalluri, Stephen Hermiller, Robert Clifton, Ford Motor Company
1:30 p.m.	**2017-01-1626**	***An Indirect Tire Health Monitoring System Using On-board Motion Sensors***
		Tomas Poloni, University of Michigan; Jianbo Lu, Ford Motor Company

2:00 p.m.	***2017-01-1623***	***Integration of Component Design Data for Automotive Turbocharger with Vehicle Fault Model Using JA6268 Methodology*** *Tim Felke, Honeywell Aerospace; Steven Holland, Sachin Raviram, General Motors*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1627***	***Online and Real-Time Condition Prediction for Transmissions based on CAN-Signals*** *Stephan Rinderknecht, Rafael Fietzek, Stõphane Foulard, TU Darmstadt*
3:30 p.m.	***Panel***	***Technical Expert Panel Discussion: Prognostics*** *Talk to the experts that make prognostics and predictive maintenance work. Discuss what quality improvements, cost savings and additional insights are gained from setting up an action oriented prognostic predictive maintenance enterprise system. What are customers saying about predicting their vehicles failure?* ***Moderators -*** *Robert Gruszczynski, Volkswagen of America* ***Panelists -*** *Anuj Bhatia, ZF TRW Active & Passive Safety Tech.; Tim Felke, Honeywell Aerospace; Rajeev Kalamdani, Ford Powertrain Operations; Tomas Poloni, University of Michigan; Sachin Raviram, General Motors LLC; Stephan Rinderknecht, TU Darmstadt; Christopher Thompson, Raytheon;*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Wednesday, April 5

CAD/CAM/CAE Technology (Part 3 of 4)

Session Code: ***SS101***

Room 331 A ***Session Time:*** ***8:00 a.m.***

This session publishes papers and presentations advancing the knowledge in product design, manufacturing processes, and engineering analysis using the state-of-the-art computer technology. The scope includes such areas as CFD, manufacturing and assembly simulation, crash-worthiness, computational mechanics, mold flow, ride simulation, ergonomic design, NVH, reverse engineering, etc. Developments in numerical methods applicable to automotive engineering problems will also be considered.

Organizers - *Randy Gu, Oakland Univ.; Jared Song, Ke Su, General Motors LLC; Yu J. Teng, BAIC; Qichao Zheng, General Motors LLC*

Chairpersons - *Randy Gu, Oakland Univ*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Simulation of the full vehicle electrodeposition for paint virtual manufacturing*** *Wanjiao Liu, Kevin Ellwood, Ford Motor Company*
8:30 a.m.	***2017-01-1310***	***Effective Application of CAE Guidance for Hemmed Closures Throughout the Vehicle Development Process*** *Harihar T. Kulkarni, Yu Wang, James Alanoly, Ford Motor Company*
9:00 a.m.	***2017-01-1323***	***The Finite Element Analysis of Axle Nut Crimping*** *Jerry Lai, Youssef Ziada, Juhchin Yang, Ford Motor Company*
9:30 a.m.		***BREAK***

10:00 a.m.	***2017-01-1329***	***A Geometrically Exact Isogeometric Blended Shell: Formulation, Benchmarking, and Automotive Application*** *Zhihui Zou, David Willoughby, Michael A. Scott, Brigham Young University; Mohamed El-Essawi, Raghuraman Baskaran, James Alanoly, Ford Motor Company*
10:30 a.m.	***2017-01-1330***	***Predicted Machining Dynamics for Powertrain Machining*** *Youssef Ziada, Juhchin Yang, David DeGroat-Ives, Ford Motor Company*
11:00 a.m.	***ORAL ONLY***	***Improving the CAD to CAE hand-off*** *Steven T. Utterdyke, ITI*

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

CAD/CAM/CAE Technology (Part 4 of 4)

Session Code: ***SS101***

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Organizers - *Randy Gu, Oakland Univ.; Jared Song, Ke Su, General Motors LLC; Yu J. Teng, BAIC; Qichao Zheng, General Motors LLC*

Chairpersons - *Yu Teng, BAIC*

Time	***Paper No.***	***Title***
1:00 p.m.	***ORAL ONLY***	***Cloud Platform for Product Innovators*** *Venkat Parameshwaran, Patrik Champati, Rag Srivastava, Altair Engineering*
1:30 p.m.	***2017-01-1320***	***Development of a Particulate Trapping System and Investigation of Effects of Viscosity of the Filter Media Using Experimental and Computational Methods*** *Yucheng Liu, Mississippi State University*
2:00 p.m.	***2017-01-1325***	***Multi-Fidelity Total Integrated Simulation Technology for High Pressure Pump with Squeeze Film Effect*** *U Oh, Kazuya Kusano, Norihiko Nonaka, Hironobu Yamakawa, Hitachi, Ltd.*
2:30 p.m.		***BREAK***
3:30 p.m.	***2017-01-1316***	***CFD Driven Parametric Design of Air-Air Jet Pump for Automotive Carbon Canister Purging*** *Dhaval Vaishnav, Mohsen Ehteshami, Vylace Collins, Syed Ali, Alan Gregory, Matthew Werner, Ford Motor Company*
4:00 p.m.	***2017-01-1331***	***Local Deformation of Hollow Crankshafts under Transient Conditions and their Effect on Durability and Slider Bearing Behavior*** *Marko Basic, AVL-AST d.o.o; Thomas Resch, AVL LIST GmbH*
4:30 p.m.	***2017-01-1313***	***Effects of Journal Roundness Phase and Amplitude on Lubrication of Engine Bearings with Consideration of Straightness*** *Bao Wang, Jianhua Zhou, Min Xu, Shanghai Jiao Tong University*

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Wednesday, April 5

Advanced Analysis, Design, and Optimization of Materials, Restraints, and Structures for Enhanced Automotive Safety and Weight Reduction (Part 2 of 3)

Session Code: ***M202***

Room 331 B ***Session Time:*** ***8:00 a.m.***

Presentations in this session include, but are not limited to, innovative ideas to enhance automotive safety with improved material constitutive modeling, analysis method developments, simulation and pre/post processing tools, optimization techniques, crash code developments, finite element model updating, model validation and verification techniques, dummies and occupants, restraint systems, passive safety as well as lightweight material applications and designs.

Organizers - *Tau Tyan, Ford Motor Company; William J. Altenhof, Univ. of Windsor; Guofei Chen, United States Steel Corp.; Wei Li, General Motors LLC; Sheng-Dong Liu, Generalety LLC; Jwo Pan, University of Michigan*

Time	Paper No.	Title
8:00 a.m.	2017-01-0361	***Safety Modeling of High Voltage Cabling in Electrified Powertrains*** *Amar Marpu, George Garfinkel, Patrick Maguire, Ford Motor Company*
8:30 a.m.	2017-01-0375	***Common Mesh Approach for Automotive Vehicle CAE Analysis*** *Ligong Pan, Seung Hyun Jung, Sushanth Ramavath, Mohamed El-Essawi, Randall Frank, Jiawei Qin, Ramarajan Ilankamban, Yuan Yao, Homa Torab, Yuzhao Song, Jim Alanoly, Ford Motor Company*
9:00 a.m.	2017-01-0373	***Avoiding Safety Scandals by Controlling the Risk of Material Changes*** *Fabian Jorg Uwe Koark, INVENSITY Inc.; Christian Beul, INVENSITY GmbH*
9:30 a.m.		***BREAK***
10:00 a.m.	2017-01-0376	***A Method of Evaluating the Joint Effectiveness on Contribution to Global Stiffness and NVH Performance of Vehicles*** *Jianyong Liang, Jonathan Powers, Scott Stevens, AK Steel Corporation; Behrooz Shahidi, Ford Motor Company*
10:30 a.m.	2017-01-0366	***Investigation on Cylinder Bore Deformation under Static Condition Based on Fourier Decomposition*** *Xingyu Liang, Yuesen Wang, State Key Lab. of Engines; Shuhe Huang, Guichun Yang, China North Engine Research Institute; Lin Tang, Guoqi Cui, Tianjin University*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 5

Advanced Analysis, Design, and Optimization of Materials, Restraints, and Structures for Enhanced Automotive Safety and Weight Reduction (Part 3 of 3)

Session Code: ***M202***

Room 331 B ***Session Time:*** ***1:00 p.m.***

Presentations in this session include, but are not limited to, innovative ideas to enhance automotive safety with improved material constitutive modeling, analysis method developments, simulation and pre/post processing tools, optimization techniques, crash code developments, finite element model updating, model validation and verification techniques, dummies and occupants, restraint systems, passive safety as well as lightweight material applications and designs.

Organizers - *Tau Tyan, Ford Motor Company; William J. Altenhof, Univ. of Windsor; Guofei Chen, United States Steel Corp.; Wei Li, General Motors LLC; Sheng-Dong Liu, Generalety LLC; Jwo Pan, University of Michigan*

Time	Paper No.	Title

1:00 p.m.	***2017-01-0379***	***Side Impact Pressure Sensor Predictions with Computational Gas and Fluid Dynamic Methods*** *Tau Tyan, Leonard Shaner, Matt Niesluchowski, Nand Kochhar, Ford Motor Company; Dilip Bhalsod, Jason Wang, Livermore Software Technology Corp.*
1:30 p.m.	***2017-01-0363***	***Validation of Expanded Polypropylene (EPP) Foam Material Models for Low Speed Bumper and Pedestrian Protection Applications*** *Karthik Ramaswamy, General Motors Technical Center India; Vinay L. Virupaksha, Jeanne Polan, General Motors LLC; Biswajit Tripathy, General Motors Technical Center India*
2:00 p.m.	***2017-01-0368***	***Study on Engine Hood with Negative Poisson's Ratio Architected Composites Based on Pedestrian Protection*** *Ying Zhao, Jilin University; Fangwu Ma, Jilin University Automotive Engrg College; Longfan Yang, Jilin University; Yueqiang Wang, China FAW Group Corporation; Hongyu Liang, Jilin University*
2:30 p.m.		***BREAK***
3:00 p.m.	***ORAL ONLY***	***Dynamic response of laminated windshield under head impact: Experiments and analytical modelling*** *Ye Yuan, Bohan Liu, Tsinghua University*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 5

Load Simulation and Vehicle Performance: Multi-body Dynamics

Session Code: ***M209***

Room 332 ***Session Time:*** ***8:00 a.m.***

The session will address multibody system modeling and simulation, rigid and flexible body modeling, loads predictions for vehicle body, frame/sub frame, exhaust system, driveline, and powertrain. Also discussed are vehicle dynamics simulation, durability loads simulation, data processing and analysis, design load minimization, prediction of loads effects, robust design methods, driver modeling, and system modeling.

Organizers - *Paramsothy Jayakumar, US Army TARDEC; Yunkai Gao, Tongji Univ.; Yunqing Zhang, Huazhong University of Science and Tech.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0419***	***Performance Optimization for the Centre Axle Trailer Combination*** *Yuliang Yang, Yu Yang, Ying Sun, Jian Zeng, Yunquan Zhang, C&C Trucks Co. Ltd.*
8:30 a.m.	***2017-01-0417***	***A Study on Optimization of the Ride Comfort of the Sliding Door Based on Rigid-Flexible Coupling Multi-Body Model*** *Yingjun Li, SAIC Motor; Yunkai Gao, Gangan Ma, Qianqian Du, Tongji University; Yabin Wan, Shanghai Aerospace Control Technology Institute*
9:00 a.m.	***2017-01-0422***	***Flexible Multibody Dynamics of Sewing Machine with Multi-Clearance Joints*** *Guohong Zhang, Huazhong University of Science and Technology; Qianqian Xie, Shuwei Zhu, Jack Sewing Machine Co., Ltd.; Yunqing Zhang, Huazhong University of Science and Technology*
9:30 a.m.		***BREAK***

10:00 a.m.	***2017-01-0418***	***Integration of Active Braking System in Multi-Body Systems Tool to Improve Prediction of Braking Loads*** *Gregory McCann, Prashant Khapane, Jaguar Land Rover*
10:30 a.m.	***2017-01-0420***	***Development of a Virtual Multi-Axial Simulation Table to Enhance the Prognosis of Loads on Powertrain Mounting System During Durability Applications*** *Prashant Khapane, Sumiran Lohani, Jaguar Land Rover*
11:00 a.m.	***2017-01-0423***	***Loads Analysis and Optimization of FSAE Race Car Frame*** *Lei Yang, Huazhong University of Science and Technology; Qiang Li, Dongfeng Motor Corporation; Chuxuan Wang, Yunqing Zhang, Huazhong University of Science and Technology*
11:30 a.m.	***2017-01-0421***	***Simulation Modeling on Dynamic Stiffness of Leaf Spring Based on Three-link Model*** *Xiang Liu, Tsinghua University; Wei Chen, Ying Chen, Dongfeng Commercial Vehicle Technical Center; Jing Zhao, Tsinghua University*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 5

Materials and Residual Stress Test DevelopmentÂ

Session Code: ***M205***

Room 332 ***Session Time:*** ***1:00 p.m.***

Topics discussed in this session include, but are not limited to residual stress (including simulation and testing), retained austenite, x-ray diffraction, neutron diffraction, induction hardening, carburizing, shot peening, and quench.

Organizers - *Xin Zhang, F.Tech. R&D North America Inc.; Gerald A. Shulke, Xichen Sun, FCA US LLC*

Time	***Paper No.***	***Title***
1:00 p.m.	***ORAL ONLY***	***Residual Stress Measurement on High-Cycle, High-Load, Rolling-Contact-Fatigue Specimens by the Contour Method*** *Daulton Isaac, Michael Prime, Los Alamos National Lab.; Nagaraj Arakere, University of Florida; Robert Homan, Wedeven Associates Inc.*
1:30 p.m.	***2017-01-0400***	***Hole Drilling With Orbiting Motion for Residual Stress Measurement â€“ Effects of Tool and Hole Diameters*** *Theo Rickert, American Stress Technologies Inc.*
2:00 p.m.	***2017-01-0399***	***Stress-Strain Relations for Nodular Cast Irons with Different Graphite Volume Fractions under Tension and Compression*** *Mohammed Yusuf Ali, Ford Motor Company; Wei-Jen Lai, Nikhil Kotasthane, University of Michigan; Jagadish Sorab, Chari Sever, Ford Motor Company; Jwo Pan, University of Michigan*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-0398***	***Utilization of TGA Flynn-Wall and Arrhenius Analysis for Rapid Prediction of Automotive PVC Cable Performance*** *Robert A. Smith, Delphi Corp.; Allison Ward, Daniel Brintnall, Delphi E/EA*
3:30 p.m.	***ORAL ONLY***	***Strain Path Tracking and Detection of Crack Onset in Aluminum Impact Beams*** *Samuel kim, Kaab Omer, Cliff Butcher, Michael Worswick, University of Waterloo*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 5

NVH CAE Analysis & Testing Correlations (Part 2 of 2)

Session Code: ***M211***

Room 333 ***Session Time:*** ***8:00 a.m.***

This session covers the development and application of numerical methods along with test correlation and optimization for NVH issues of full vehicle and vehicle subsystems. All structural components, subsystems and complete systems found in automotive vehicles will be considered. Topics include structure NVH, vibro-acoustics, wind noise and aeroacoustics, intake/exhaust and vehicle interior noise, sound quality etc.

Organizers - *Weiguo Zhang, Honglu Wang, FCA US LLC; Guangtian Gavin Song, Luohui Long, Ford Motor Company*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0448***	***Automotive Refrigerant System Induced Phenomena â€“ Bench to Vehicle Correlation*** *Prakash T. Thawani, Stephen Sinadinos, John Zvonek, DENSO International America Inc.*
8:30 a.m.	***2017-01-0446***	***Vibration and Noise Analysis of Engine Variable Displacement Oil Pump*** *Xiao Chuan Xu, Xiuyong Shi, Jimin Ni, Jiaqi Li, Xiaochuan Xu Sr., Tongji University*
9:00 a.m.	***2017-01-0449***	***Correlation Analysis of Interior and Exterior Wind Noise Sources of a Production Car Using Beamforming Techniques*** *Yinzhi He, Bin Wang, Zhe Shen, Zhigang Yang, Tongji University; Gunnar Heilmann, Gfaitech GmbH; Tao Zhang, Guoxu Dong, Changan Automobile Co. Ltd.*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0440***	***Design Optimization of Vehicle Body NVH Performance Based on Dynamic Response Analysis*** *Jun Lu, Zhenfei Zhan, Haozhan Song, Xu Liu, Xin Yang, Junqi Yang, Chongqing University*
10:30 a.m.	***2017-01-0442***	***Approaches of NVH Improvements for Fuel Pump Noise Issues*** *Harchetan Singh Aneja, Manas Tripathi, Harmeet Singh, Aashish Parmar, Maruti Suzuki India, Ltd.*
11:00 a.m.	***2017-01-0439***	***Design for Improvement in Steering Vibration Performance in a Passenger Vehicle*** *Joydeep Chatterjee, Yuva Kishore Vaddi, Chetan Prakash Jain, Maruti Suzuki India, Ltd.*
11:30 a.m.	***2017-01-0443***	***Minimizing the Rattling of Door Glass*** *Yong Hyun Nam, Gwansik Yoon, Hyundai Motor Company*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 5

Load Simulation and Vehicle Performance: Handling and Dynamics (Part 1 of 2)

Session Code: ***M210***

Room 333 ***Session Time: 1:00 p.m.***

This session focuses on analysis and enhancement of vehicle dynamics performance including handling/ braking/ traction characteristics as well as robustness and active stability under the influence of loading, tire forces and intelligent tire technology for enhancing overall vehicle system dynamics and safety characteristics and robustness. Load variations and other uncertainties, impact of system hybridization and electrification on vehicle dynamics and controls will be discussed.

Organizers - *Bin Li; Michael Royce; Dongpu Cao, Cranfield Univ.; Nenggen Ding; Ken Kang, Honda R & D Americas Inc.*

Time	Paper No.	Title
1:00 p.m.	2017-01-0436	***Implementation of an Extended Model for Multi-axle Articulated Vehicle with Nonlinear Tire Model*** *Tianjun Zhu, Hebei University of Engineering; Bin Li, Concordia University Montreal*
1:30 p.m.	2017-01-0430	***Investigation of the Influence of an Hydraulically Interconnected Suspension (HIS) on Steady-State Cornering*** *Bangji Zhang, Kaidong Tian, Wen Hu, Jie Zhang, Hunan University; Nong Zhang, University of Technology Sydney*
2:00 p.m.	2017-01-0438	***A Multi-mode Control Strategy for EV Based on Typical Situation*** *Zhenhai Gao, Tianjun Sun, Lei He, Jilin University*
2:30 p.m.		***BREAK***
3:00 p.m.	2017-01-0428	***Parameter Sensitivity Analysis of a Light Duty Truck Steering Returnability Performance*** *Tianqi Lv, Huazhong University of Science and Technology; Yan Wang, Dong Feng Automobile Co.,Ltd.; Xingxing Feng, Yunqing Zhang, Huazhong University of Science and Technology*
3:30 p.m.	2017-01-0435	***Integrated Model-In-Loop (MiL) Simulation Approach to Validate Active Roll Control System*** *Koundinya Narasimha Kota, Bharath Sivanandham, Tata Technologies, Ltd.*
4:00 p.m.	2017-01-0437	***Yaw stability enhancement of articulated heavy vehicles via gain-scheduling optimal control*** *Bin Li, Subhash Rakheja, Concordia University Montreal*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 5

Advances in Lightweight Materials (Part 1 of 2)

Session Code: M102

Room 334 ***Session Time: 8:00 a.m.***

This session presents the latest developments in automotive applications of wrought products. The papers cover a wide range of the technical aspects including alloy development, lightweight design, process development and simulation as well as performance optimization.

Organizers - *Jidong Kang, CanmetMATERIALS Technology Laboratory; Fadi Abu-Farha, Clemson Univ.; Alan Luo, Ohio State University; Douglas Richman, Kaiser Aluminum*

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	***Technical Keynote: North American Light Vehicle ALUMINUM CONTENT Trends Past- Present and Future*** *Richard Schultz, Ducker Research Co. Inc.*

9:00 a.m.	***ORAL ONLY***	***Development of Next Generation High Strength Aluminum Alloys for Automotive Applications*** *Rajeev Kamat, Novelis Global Technology Center*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1271***	***Stress-Corrosion Cracking Evaluation of Hot-Stamped AA7075-T6 B-Pillars*** *David Wright, John Henshaw, University of Tulsa; Nia R. Harrison, S. George Luckey, Ford Motor Company*
10:30 a.m.	***ORAL ONLY***	***Corrosion Modeling of Lightweight Automotive Mixed-Materials*** *Kerrie Holguin, Niamh Hosking, Mark Nichols, Ford Motor Company; Kuo-Hsiang Chang, Gerald Frankel, Ohio State University*
11:00 a.m.	***ORAL ONLY***	***Coefficient of Thermal Expansion Mismatch Effects in Multi-Material Lightweight Automotive Structures*** *Fadi Abu-Farha, Clemson Univ.; Aravindhan Raveendran, Clemson University; Michael Flener, Henkel*

Planned by Metallic Materials Committee / Materials Engineering Activity

Wednesday, April 5

Advances in Lightweight Materials (Part 2 of 2)

Session Code: ***M102***

Room 334 ***Session Time:*** ***1:00 p.m.***

This session presents the latest developments in automotive applications of wrought products. The papers cover a wide range of the technical aspects including alloy development, lightweight design, process development and simulation as well as performance optimization.

Organizers - *Jidong Kang, CanmetMATERIALS Technology Laboratory; Fadi Abu-Farha, Clemson Univ.; Alan Luo, Ohio State University; Douglas Richman, Kaiser Aluminum*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1272***	***Aluminum Extrusions for Automotive Crash Applications*** *Nick Parson, RTA; Jerome Fourmann, Rio Tinto Alcan; Jean-Francois Beland, National Research Council Canada*
1:30 p.m.	***2017-01-1265***	***Paint Bake Influence on AA7075 and AA7085*** *Nia R. Harrison, S. George Luckey, Ford Motor Company; Breana Cappuccilli, Ghassan Kridli, University of Michigan-Dearborn*
2:00 p.m.	***~~2017-01-1268~~*** ***ORAL ONLY***	***Lightweight Subframe for Compact Car â€' Magnesium Casting Design*** *Xiaoming Chen, Ford Motor Company*
2:30 p.m.		***BREAK***
3:00 p.m.	***2017-01-1264***	***Forging Stock Anneal Optimization for Automotive Pressure Vessel Applications*** *Gregory L. Talbert, Edward John Vinarcik, Nanshan America*
3:30 p.m.	***~~2017-01-1270~~*** ***ORAL ONLY***	***Shear Test Sample Development for Magnesium Alloys*** *Xiaoming Chen, Ford Motor Company*

Planned by Metallic Materials Committee / Materials Engineering Activity

Wednesday, April 5

Welding and Joining and Fastening (Part 1 of 3)

Session Code: ***M216***

Room 334 ***Session Time:*** ***1:00 p.m.***

Presentations in this session include welding (i.e., friction stir, ultrasonic, resistance, arc, laser, etc.) and joining (i.e., brazing, soldering, riveting, bolting, and adhesives) of similar or dissimilar materials (i.e., plastics, composites, aluminum, magnesium, titanium, and conventional and advanced high strength steels). Strength, fracture, and fatigue implications of these methodologies will be discussed.

Organizers - *Pai-Chen Lin, National Chung Cheng Univ.; Jwo Pan, University of Michigan; Tau Tyan, Ford Motor Company*

Time	Paper No.	Title
1:00 p.m.	2017-01-0478	**Fatigue Analysis of Swept Friction Stir Clinch Joints between Aluminum and Steel Sheets** *Pai-Chen Lin, WeiNing Chen, National Chung Cheng University*
1:30 p.m.	2017-01-0477	**Impact of Rivet Head Height on the Tensile and Fatigue Properties of Lap Shear Self-Pierced Riveted CFRP to Aluminum** *Harish M. Rao, Jidong Kang, CanmetMATERIALS Technology Laboratory; Garret Huff, Katherine Avery, Xuming Su, Ford Motor Company*
2:00 p.m.	2017-01-0470	**Closed-Form Structural Stress Solutions for Fatigue Life Estimations of Flow Drill Screw Joints in Lap-Shear Specimens of Aluminum 6082-T6 Sheets** *Lunyu Zhang, Shin-Jang Sung, Jwo Pan, University of Michigan; Xuming Su, Peter Friedman, Ford Motor Company*
2:30 p.m.		**BREAK**
3:00 p.m.	2017-01-0475	**Finite Element Analyses of Stress Intensity Factor Solutions for Discontinuous Gas Metal Arc Welds under Lap-Shear Loading Conditions** *Catherine Amodeo, Jwo Pan, University of Michigan*
3:30 p.m.	2017-01-0473	**Influence of Ductility Ingredients of Structural Adhesives on Fracture Energy under Static Mixed-Mode Loading** *Satoshi Nakada, Toru Furusawa, Eiichiro Yokoi, Honda R&D Co., Ltd.; R Carbas, M Costa, E Marques, G Viana, LFM da Silva, INEGI Polo FEUP*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Wednesday, April 5

Advances in Metalcasting (Part 1 of 2)

Session Code: ***M106***

Room 336 ***Session Time:*** ***8:00 a.m.***

Metalcasting is one of the oldest manufacturing processes, dating back over five millenniaÂ However, recent advances continue to expand the horizons of metalcasting. This session will cover the latest developments in metalcasting technologies for the automotive, aerospace, off-road, commercial vehicle, and small engine industries. Part 1 of this session is focused on lightweight casting solutions.

Organizers - *David Elijah Palmer, Bombardier Recreational Product Inc.; Zayna Connor, Thomas Prucha, American Foundry Society Inc.; Lin Zhang, FCA US LLC*

Time	Paper No.	Title
8:00 a.m.	2017-01-1665	**Latest Advances in Aluminum Shape Casting** *Qigui Wang, Peggy Jones, Yucong Wang, Dale Gerard, General Motors LLC*

8:30 a.m.	***2017-01-1666***	***Low Density and Temperature Tolerant Alloys for Automotive Applications*** *David Weiss, ECK Industries Inc.; Orlando Rios, Oak Ridge National Laboratory*
9:00 a.m.	***ORAL ONLY***	***Modern High Pressure Die Casting Aluminum Alloys for Car Bodies*** *Stuart Wiesner, Rheinfelden ALLOYS GmbH & Co. Kg; Ralf Klos, RHEINFELDEN ALLOYS GmbH & Co. KG; Lilia Kurmanaeva, Rheinfelden ALLOYS GmbH & Co. KG*
9:30 a.m.		***BREAK***
10:00 a.m.	***ORAL ONLY***	***Hot Tearing of Cast Al-Cu Alloy*** *Kumar Sadayappan, CanmetMATERIALS, NRCan; Diran Apelian, MPI, Worcester Polytechnic Institute; Shimin li, MPI, Worcester Polytechnic institute*
10:30 a.m.	***ORAL ONLY***	***Thin-Wall Aluminum Die Casting Development*** *Michael Zolnowski, Boeing Research & Technology - Missouri; Alan Luo, Ohio State University; Diran Apelian, Worcester Polytechnic Institute*
11:00 a.m.	***ORAL ONLY***	***Developing and Deploying Thin Walled Ductile Iron Castings for High Volume Production*** *Jay Solomond, MPG Casting Technologies; Paul Sanders, Michigan Technological Univ.*

Planned by Metallic Materials Committee / Materials Engineering Activity

Wednesday, April 5

Advances in Metalcasting (Part 2 of 2)

Session Code: ***M106***

Room 336 ***Session Time:*** ***1:00 p.m.***

Metalcasting is one of the oldest manufacturing processes, dating back over five millenniaÂ However, recent advances continue to expand the horizons of metalcasting. This session will cover the latest developments in metalcasting technologies for the automotive, aerospace, off-road, commercial vehicle, and small engine industries. Part 2 of this session is focused on the use of additive manufacturing (3D printing) to enable advanced metalcasting.

Organizers - *David Elijah Palmer, Bombardier Recreational Product Inc.; Zayna Connor, Thomas Prucha, American Foundry Society Inc.; Lin Zhang, FCA US LLC*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1663***	***Advanced Castings Made Possible Through Additive Manufacturing*** *Alan Druschitz, Virginia Tech.; Christopher Williams, Erin Connelly, Virginia Tech; Bob Wood, ExOne*
1:30 p.m.	***ORAL ONLY***	***3D Printing for Rapid Prototyping of Automotive Castings*** *Joy Hines Forsmark, Ellen Lee, Harold Sears, Ford Motor Company*
2:00 p.m.	***ORAL ONLY***	***Capabilities and Limitations of Additive Manufacturing for Metal Casting*** *Gerard Thiel, Univ. of Northern Iowa*
2:30 p.m.		***BREAK***

3:00 p.m.	***ORAL ONLY***	***Using Additive Manufacturing to Produce Your Metal Casting Requirements from Legacy to Prototype*** *Steven R. Murray, Hoosier Pattern*
3:30 p.m.	***ORAL ONLY***	***A Lightweighting Framework for Concept Design for Efficient Manufacturing: Merging Topology Optimization and Additive Manufacturing with Traditional Casting*** *Ravi Kunju, Altair Engineering*

Planned by Metallic Materials Committee / Materials Engineering Activity

Wednesday, April 5

Sheet Metal Forming Technology (Part 3 of 4)

Session Code: ***M105***

Room 338 ***Session Time:*** ***8:00 a.m.***

This session will feature the latest developments in sheet metal forming technology. Presentations will address general areas of forming processes, formability issues and modeling. These include forming processes (Stamping, hydroforming, gas forming, high temperature forming), formability Issues (springback, edge cracking, stretch-bend failures and fracture), Modeling (materials, forming limits, failure criteria in various deformation modes and process modeling & optimization).

Organizers - *Xiaoming Chen, US Steel; Thomas Oetjens, CAE International Inc.; ZiQiang Sheng, General Motors LLC; Michael J. Worswick, University of Waterloo; Dajun Zhou*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0315***	***A Comprehensive Plasticity and Fracture Model for Metal Sheets under Multi-axial Stress and Non-Linear Strain Path*** *Yueqian Jia, Yangyang Qiao, Hao Pan, University of Central Florida; Edmund Chu, Alcoa Inc; Yuanli Bai, University of Central Florida*
8:30 a.m.	***2017-01-0312***	***Predicting Forming Limit Curve Using a New Ductile Failure Criterion*** *ZiQiang Sheng, General Motors LLC; Pankaj Mallick, University of Michigan-Dearborn*
9:00 a.m.	***2017-01-0301***	***Determination of the Forming Limit Curve Using Digital Image Correlation - Comparison of Different Approaches to Pinpoint the Onset of Localized Necking*** *Lu Huang, Ming Shi, United States Steel Corporation*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0314***	***Determination of Fracture Strain of Advanced High Strength Steels Using Digital Image Correlation in Combination with Thinning Measurement*** *Lu Huang, Ming Shi, United States Steel Corporation; Patrick Russell, Clemson University*
10:30 a.m.	***2017-01-0309***	***Evaluation of DIC Based Forming Limit Curve Methods at Various Temperatures of Aluminum Alloys for Automotive Applications*** *Mitchell Rencheck, Paul Zelenak, Jianhui Shang, Hyunok Kim, Edison Welding Institute*
11:00 a.m.	***2017-01-0316***	***Characterization of 6XXX Series Aluminum Extrusions Using Digital Image Correlation (DIC) technique*** *Kiran Mallela, Andrey Ilinich, S Luckey, Danielle Zeng, Yuan Gan, Ford Motor Company*

Planned by Metallic Materials Committee / Materials Engineering Activity

Wednesday, April 5

Sheet Metal Forming Technology (Part 4 of 4)

Session Code: ***M105***

Room 338 ***Session Time:*** ***1:00 p.m.***

This session will feature the latest developments in sheet metal forming technology. Presentations will address general areas of forming processes, formability issues and modeling. These include forming processes (Stamping, hydroforming, gas forming, high temperature forming), formability Issues (springback, edge cracking, stretch-bend failures and fracture), Modeling (materials, forming limits, failure criteria in various deformation modes and process modeling & optimization).

Organizers - *Xiaoming Chen, US Steel; Thomas Oetjens, CAE International Inc.; ZiQiang Sheng, General Motors LLC; Michael J. Worswick, University of Waterloo; Dajun Zhou*

Time	Paper No.	Title
1:00 p.m.	2017-01-0308	***Practical Evaluation and Prediction of Edge Cracking in Forming Advanced High Strength Steels (AHSS)*** *Hyunok Kim, Jianhui Shang, EWI Forming Center; James Dykeman, Honda R&D America Inc.; Anoop Samant, KTH Parts Industries; Clifford Hoschouer, Shiloh Industries Inc*
1:30 p.m.	2017-01-0300	***Criteria for Predicting Skid Line by Simulation*** *Hong Yao, Sriram Sadagopan, Min Kuo, ArcelorMittal Global R&D; Liang Huang, Evangelos Liasi, Ford Motor Company*
2:00 p.m.	2017-01-0305	***Physical Drawbead Design and Modeling with ABAQUS/Isight*** *Liang Huang, Ford Motor Company; Charles Yuan, Dassault Systemes Simulia Corp*
2:30 p.m.		***BREAK***
3:00 p.m.	ORAL ONLY	***Draw Bead Strain and Force Calculation for Automotive Sheet Stamping*** *Yuan Gan, Feng Ren, Yinong Shen, Liang Huang, Ford Motor Company*

Planned by Metallic Materials Committee / Materials Engineering Activity

Wednesday, April 5

Autonomous Systems (Part 3 of 4)

Session Code: ***AE506***

Room 353 ***Session Time:*** ***8:00 a.m.***

In addition to increasing access to personal mobility, automated vehicles aim to increase driving safety. However there are challenges on the road to developing the automated systems. This session addresses the technical challenges which include robust static and dynamic object detection, path planning, driving strategy, system architecture choices, simulation tool development, etc.

Organizers - *Sue Bai, Honda; Geoff Bauer, Continental Corp.; Sara Dadras, Ford Motor Company; Linson Qiao, Continental Corp.*

Chairpersons - *Geoff Bauer, Linson Qiao, Continental Corp.*

Time	Paper No.	Title
8:00 a.m.	2017-01-0103	***Reducing Complexity in Routing of Non-Standard Intersections, to Aid in Autonomous Vehicle Navigation*** *Thomas Beyerl, Bernard Ibru, Charvi Popat, Deborah Ojo, Alexander Bakus, Jessica Elder, Valentin Soloiu, Georgia Southern University*

8:30 a.m.	***2017-01-0117***	***Object Detection from a Vehicle Using Deep Learning Network and Future Integration with Multi-Sensor Fusion Algorithm*** *Raja Sekhar Dheekonda, Sampad Panda, Md Nazmuzzaman khan, Mohammad Hasan, Sohel Anwar, Indiana University - Purdue University Indianapolis*
9:00 a.m.	***2017-01-0104***	***Region Proposal Technique for Traffic Light Detection Supplemented by Deep Learning and Virtual Data*** *Maryam Moosaei, University of Notre Dame; Yi Zhang, Ashley Micks, Simon Smith, Madeline J. Goh, Vidya Nariyambut Murali, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0109***	***Vision Based Object Distance Estimation*** *Yi Zhang, Madeline J. Goh, Vidya Nariyambut Murali, Ford Motor Company*
10:30 a.m.	***2017-01-0096***	***Optimizing Color Detection with Robotic Vision Sensors for Lane Following and Traffic Sign Recognition in Small Scale Autonomous Test Vehicles*** *Valentin Soloiu, Bernard Ibru, Thomas Beyerl, Tyler Naes, Charvi Popat, Cassandra Sommer, Brittany Williams, Georgia Southern University*
11:00 a.m.	***ORAL ONLY***	***Advanced Computational Tools for W-band Automotive Radar Behind Automotive Covers*** *Aseim Elfrgani, C. J. Reddy, Altair Engineering*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Wednesday, April 5

Autonomous Systems (Part 4 of 4)

Session Code: ***AE506***

Room 353 ***Session Time:*** ***1:00 p.m.***

In addition to increasing access to personal mobility, automated vehicles aim to increase driving safety. However there are challenges on the road to developing the automated systems. This session addresses the technical challenges which include robust static and dynamic object detection, path planning, driving strategy, system architecture choices, simulation tool development, etc.

Organizers - *Sue Bai, Honda; Geoff Bauer, Continental Corp.; Sara Dadras, Ford Motor Company; Linson Qiao, Continental Corp.*

Chairpersons - *Geoff Bauer, Linson Qiao, Continental Corp.*

Time	***Paper No.***	***Title***
1:00 p.m.	***ORAL ONLY***	***Open Discussion*** *All In Attendance*
1:30 p.m.	***2017-01-0099***	***A Bootstrap Approach to Training DNNs for the Automotive Theater*** *Jose E. Solomon, Francois Charette, Ford Motor Company*
2:00 p.m.	***2017-01-0114***	***Towards a Supermileage Autonomous Vehicle*** *Jorge De-J. Lozoya Santos, J. C. Tudon-Martinez, Universidad de Monterrey*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Wednesday, April 5

Sensors and Actuators

Session Code: ***AE302*** ***8:00 a.m.***

Room 354 ***Session Time:***

Modern automotive customers need safer vehicles with little or no impact to the environment. The purpose of this session is to present the latest research and development on novel sensors, actuators, and circuits that are critical to deliver the function of today's complex automotive systems.

Organizers - *Abraham Shocket, Lyle Stanley Bryan, TE Connectivity; ChenFang Chang, General Motors LLC; Scott Phillips, TE Connectivity*

Chairpersons - *Abraham Shocket, Scott Phillips, TE Connectivity*

Time	Paper No.	Title
8:00 a.m.	ORAL ONLY	**Technical Keynote: Diesel Exhaust Gas After Treatment OBD Sensor Integration** *Jean Milpied, TE Connectivity*
8:30 a.m.	2017-01-1638	**TPMS Tire Localization with RF Transceiver** *Felix Gow, Infineon Technologies Asia Pacific Pte; Lifeng Guan, Automotive Semiconductor Supplier; Jooil Park, Infineon Technologies Asia Pacific Pte*
9:30 a.m.		**BREAK**
10:00 a.m.	2017-01-1637	**Extreme Long Travel Range Detection Technology** *David Cheng, TE Connectivity (Shanghai) Co., Ltd.*
10:30 a.m.	2017-01-1639	**Real-time Sensing of Particulate Matter in a Vehicle Exhaust System** *Gerard W. Malaczynski, Gregory Roth, Delphi Automotive Systems*
11:00 a.m.	2017-01-1636	**Development of a Thermal Model for a Heated Steering Wheel to Compensate Defective Feedback Variables** *Lukas Preusser, Ford Motor Company*

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Wednesday, April 5

Internet of Things and Integrated Cloud Technology

Session Code: ***AE507***

Room 356 ***Session Time:*** ***8:00 a.m.***

Internet of Things joins everything: the customer, the OEMs, the Suppliers, hardware, software, safety, security, networks, storage, cloud and anything else you can think of connected to the internet. There are changes in paradigms, products, business models, sheer volume of data and the speed in which everything works. Learn about the technologies, strategies, integration, standards, products, needs, predictions and societal changes that IoT is driving. Meet the people that make it happen.

Organizers - *Tim A. Cavanaugh, Cavanaugh Consulting; Arnold Taube, John Deere World Headquarters*

Time	Paper No.	Title
8:00 a.m.	2017-01-1649	**SmartDeviceLink as an Open Innovation Platform for Connected Car Features and Mobility Applications** *Jeffrey Yeung, Omar Makke, Perry MacNeille, Oleg Gusikhin, Ford Motor Company*
8:30 a.m.	2017-01-1650	**Using Bluetooth Low Energy for Dynamic Information-Sharing in Vehicle-to-Vehicle Communication** *Jian Yang, Christian Poellabauer, University of Notre Dame; Pramita Mitra, Ford Motor Company*

9:00 a.m.	***2017-01-1647***	***Conceptual Design of the Elderly Healthcare Services In-Vehicle using IoT*** *Se Jin Park, Murali Subramaniyam, Seunghee Hong, Damee Kim, Korea Res Inst of Standards & Science; Jaehak Yu, ETRI*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1651***	***Vehicle Deep Data: A Case Study in Robust Scalable Data Collection*** *Douglas Thornburg, John Schmotzer, MJ Throop, Ford Motor Company*
10:30 a.m.	***Panel***	***Technical Expert Panel Discussion: IoT and Cloud Technology*** *Look, listen and learn how IoT Professionals set up systems that integrate well with the auto industry. Discover areas that are being standardized to run quicker and the parts that havenâ€™t been harnessed yet. Talk to the experts and ask for possible solutions to industry hurtles that need to be overcome like security, speed, storage and integration.* ***Moderators -*** *Joseph Barkai* ***Panelists -*** *Eyal Amir, Parknav; Scott Amyx, Amyx+; Gloria D'Anna, General Telecom Systems Inc.; Binoy Damodaran, IBM Corporation; Michael Keefe, Weather Telematics;*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Wednesday, April 5

Technical Expert Panel Discussion: IoT and Cloud Technology

Session Code: ***AE507***

Room 356 ***Session Time:*** ***10:30 a.m.***

Look, listen and learn how IoT Professionals set up systems that integrate well with the auto industry. Discover areas that are being standardized to run quicker and the parts that havenâ€™t been harnessed yet. Talk to the experts and ask for possible solutions to industry hurtles that need to be overcome like security, speed, storage and integration.

Organizers - *Tim A. Cavanaugh, Cavanaugh Consulting*

Moderators - *Joseph Barkai*

Panelists - *Eyal Amir, Parknav; Scott Amyx, Amyx+; Gloria D'Anna, General Telecom Systems Inc.; Binoy Damodaran, IBM Corporation; Michael Keefe, Weather Telematics;*

Time	***Paper No.***	***Title***
	ORAL ONLY	***Learn more about the panel participants*** *Learn more about the panel participants* *Joseph Barkai; Gloria D'Anna, General Telecom Systems Inc.; Binoy Damodaran, IBM Corporation; Michael Keefe, Weather Telematics*

Wednesday, April 5

Systems Engineering (Part 1 of 3)

Session Code: ***AE101***

Room 356 ***Session Time:*** ***1:00 p.m.***

This session covers intelligent and efficient approaches to high level system design, analysis and integration as well as considerations for vehicle-level optimization of cost and energy. System definition includes components, sub-assemblies and complete integrated vehicle systems, including electronic systems and human machine interfaces.

Organizers - *Subramaniam Ganesan, Oakland Univ.; Paolo Giusto, General Motors LLC; Amit Choudhury, TRW Automotive; Krzysztof Czarnecki, Univ. of Waterloo; Grant Soremekun, Andrew Brocker, General Motors LLC; Phares A. Noel, Diversified Engineering Concepts LLC; Kanaparty Rao; Ramesh S, General Motors LLC*

Chairpersons - *Subramaniam Ganesan, Oakland Univ*

Time	Paper No.	Title
1:00 p.m.	ORAL ONLY	**Design by ECO: Can the Burden of Change Management be minimized?** *Nick Smith, Mentor Graphics Corp*
1:30 p.m.	ORAL ONLY	**Systems Engineering: Extending Across Physical Implementation** *Bill Chown, Mentor Graphics Corp*
2:00 p.m.	2017-01-1598	**Development Solar charging system of Vehicle** *Koichi Go, Takahiro Hirano, Tatsuya Miyoshi, Daisuke Sato, Toyota Motor Corporation*
2:30 p.m.		**BREAK**
3:00 p.m.	2017-01-1599	**Systems Engineering Approach for Voice Recognition in the Car** *Joshua Wheeler, Brigitte Richardson, Scott Amman, An Ji, John Huber, Ranjani Rangarajan, Ford Motor Company*
3:30 p.m.	2017-01-1612	**CAN Crypto FPGA Chip to Secure Data Transmitted Through CAN FD Bus Using AES-128 and SHA-1 Algorithms with A Symmetric Key** *Tri P. Doan, Subramaniam Ganesan, Oakland University*
4:00 p.m.	2017-01-1603	**Integrated Systems Engineering Approach for Incremental 48Volt Hybrid Technology Introduction** *Ashish Naidu, Peter Brittle, Xiaoyu Ma, Brian Rutter, Ford Motor Company*
4:30 p.m.	2017-01-1613	**Over the Air Software Update Realization within Generic Modules with Microcontrollers Using External Serial FLASH** *Atilla Bulmus, Infineon Technologies Americas Corp.; Axel Freiwald, Infineon Technologies AG; Chris Wunderlich, Infineon Technologies Americas Corp.*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Wednesday, April 5

Software Design Engineering and Development (Part 1 of 2)

Session Code: ***AE105***

Room 357 ***Session Time:*** ***8:00 a.m.***

This session concentrates on the development and implementation of embedded software architectures that reside in production vehicle electronic modules. Topics include implementation on multi-core processors, parallel computing environments, multi-processor and multi-ECU systems, and the deployment of AUTOSAR. Expert speakers from the embedded software community are encouraged to share their experiences and opinions.

Organizers - *Robert Miller, Hussain Darwish, Ralf Fritz, Vector CANtech Inc.*

Time	Paper No.	Title
8:00 a.m.	2017-01-1616	**CalDef System for Automotive Electronic Control Unit Calibrations** *Scott A. Rush, General Motors LLC*

8:30 a.m.	***2017-01-1618***	***On the Timing Analysis at Automotive Real-Time Embedded Systems*** *Max Mauro Dias Santos, Victor Ambiel, Mauro Acras, UTFPR-PG; Peter Gliwa, Gliwa GmbH*
9:00 a.m.	***2017-01-1621***	***Timing Analysis for Hypervisor-based I/O Virtualization in Safety-Related Automotive Systems*** *Andre Kohn, Karsten Schmidt, AUDI AG; Jochen Decker, Easycore GmbH; Maurice Sebastian, Symtavision GmbH; Alexander ZÃ¼pke, RheinMain University of Applied Sciences; Andreas Herkersdorf, Technical University of Munich*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1615***	***Metric-based Evaluation of Powertrain Software Architecture*** *Hariharan Venkitachalam, Christian Granrath, RWTH Aachen Univ.; Balachandar Gopalakrishnan, Technische Hochschule Ingolstadt; Johannes Richenhagen, FEV GmbH*
10:30 a.m.	***2017-01-1620***	***Development of a Fork-Join Dynamic Scheduling Middle-Layer for Automotive Powertrain Control Software*** *Waseem Sadeh, Osamah Rawashdeh, Oakland University; Dona Burkard, Kelvin Dobbins, Tony Lockwood, Ford Motor Company; Atilla Bulmus, Infineon Technologies North America Corp.*
11:00 a.m.	***ORAL ONLY***	***Fault Tolerant and Memory Saving Boot-Loader for Automotive Electronic Control Units*** *Venkata Raghunath K. Rachabattuni, TVS Motor Co., Ltd.; Samraj Jabez Dhinagar, TVS Motor Co Ltd*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Wednesday, April 5

Software Design Engineering and Development (Part 2 of 2)

Session Code: ***AE105***

Room 357 ***Session Time:*** ***1:00 p.m.***

This session concentrates on the development and implementation of embedded software architectures that reside in production vehicle electronic modules. Topics include implementation on multi-core processors, parallel computing environments, multi-processor and multi-ECU systems, and the deployment of AUTOSAR. Expert speakers from the embedded software community are encouraged to share their experiences and opinions.

Organizers - *Robert Miller, Hussain Darwish, Ralf Fritz, Vector CANtech Inc.*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1622***	***From the Napkin to Autocode, a Body Control Module Software Development Journey*** *Ronald Brombach, Ford Motor Company; Anup Gadkari, Tata Consultancy Services*
1:30 p.m.	***ORAL ONLY***	***From Research to Mass Production: Using a Versatile Platform for Developing New HAD Software Functions*** *Sebastian Ohl, Elektrobit Automotive GmbH*
2:00 p.m.	***2017-01-1619***	***Safe Handling of Floating Point Math in C Code Embedded Applications*** *Charles Loucks, Ford Motor Company*
2:30 p.m.		***BREAK***

3:30 p.m.	***2017-01-1617***	***Consolidating AUTOSAR with Complex Operating Systems (AUTOSAR on Linux)*** *Sherif Aly, Mentor Graphics Corp.*

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Wednesday, April 5

Intelligent Transportation Systems (Part 1 of 3)

Session Code: ***AE504***

Room 358 ***Session Time:*** ***8:00 a.m.***

Intelligent Transportation Systems (ITS) includes smart vehicles, smart roads and infrastructure, and wired and wireless communications to link them together. This session will provide insights and progress reports on the latest ITS research, development, and deployment around the world. Time to collision estimations, embedded processor control, adaptive cruise control and image recognition along with discussion on the management of safety and safety systems.

Organizers - *Jan-Mou Li, Oak Ridge National Laboratory; Sara Dadras, Ford Motor Company; Hirofumi Onishi, Alpine Electronics of America Inc.*

Chairpersons - *Jan-Mou Li, Jan-Mou Li, Oak Ridge National Laboratory; Hirofumi Onishi, Alpine Electronics of America Inc.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0080***	***Safe Travelling Speed of Commercial Vehicles on Curves Based on Vehicle-Road Collaboration*** *Qilu Wang, Bo Yang, Gangfeng Tan, Shengguang Xiong, XiaoXiao Zhou, Wuhan University of Technology*
8:30 a.m.	***2017-01-0092***	***Cloud-Driven Traffic Monitoring and Control Based on Smart Virtual Infrastructure*** *Vladimir Hahanov, Kharkov Nat. University of Radioelectronics; Wajeb Gharibi, Jazan University; Eugenia Litvinova, Svitlana Chumachenko, Arthur Ziarmand, Kharkov Nat. University of Radioelectronics; Irina Englesi, Igor Gritsuk, Vladimir Volkov, Kharkov National Auto Highway University; Anastasiia Khakhanova, Kharkov Nat. University of Radioelectronics*
9:00 a.m.	***2017-01-0087***	***Smart On-Street Parking System to Predict Parking Occupancy and Provide a Routing Strategy Using Cloud-Based Analytics*** *Jiaqi Ma, Erin Clausing, Yimin Liu, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0083***	***Reliable Infrastructural Urban Traffic Monitoring Via Lidar and Camera Fusion*** *Yi Tian, Hangxin Liu, Tomonari Furukawa, Virginia Tech*
10:30 a.m.	***2017-01-0082***	***A High-Resolution Surface Image Capture and Mapping System for Public Roads*** *Yazhe Hu, Tomonari Furukawa, Virginia Tech*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Wednesday, April 5

Intelligent Transportation Systems (Part 2 of 3)

Session Code: ***AE504***

Room 358 ***Session Time: 1:00 p.m.***

Intelligent Transportation Systems (ITS) includes smart vehicles, smart roads and infrastructure, and wired and wireless communications to link them together. This session will provide insights and progress reports on the latest ITS research, development, and deployment around the world. Time to collision estimations, embedded processor control, adaptive cruise control and image recognition along with discussion on the management of safety and safety systems.

Organizers - *Jan-Mou Li, Oak Ridge National Laboratory; Sara Dadras, Ford Motor Company; Hirofumi Onishi, Alpine Electronics of America Inc.*

Chairpersons - *Sara Dadras, Sara Dadras, Ford Motor Company*

Time	Paper No.	Title
1:00 p.m.	2017-01-0086	**Potentials for Platooning in U.S. Highway Freight Transport** *Matteo Muratori, Jacob Holden, Michael Lammert, Adam Duran, Stanley Young, Jeffrey Gonder, National Renewable Energy Laboratory*
1:30 p.m.	2017-01-0089	**Development of a Cruise Controller Based on Current Road Load Information with Integrated Control of Variable Velocity Set-Point and Gear Shifting** *Antonio D'Amato, Fabrizio Donatantonio, Ivan Arsie, Cesare Pianese, University of Salerno*
2:00 p.m.	2017-01-0090	**Adaptive Nonlinear Model Predictive Cruise Controller: Trailer Tow Use Case** *Ondrej Santin, Jaroslav Beran, Jaroslav Pekar, Honeywell Automotive Software; John Michelini, Junbo Jing, Steve Szwabowski, Dimitar Filev, Ford Motor Company*
2:30 p.m.		**BREAK**
3:00 p.m.	2017-01-0079	**The Tunnel Climbing Acceleration Reminder System Based on Vehicle Dynamics** *Hao Liu, Gangfeng Tan, Mengying Yang, Xiaoxiao Zhou, Yu Tang, Wuhan University of Technology*
3:30 p.m.	2017-01-0084	**Safety Speed Assessment for Driving in Foggy Environment Based on Visibility and Vehicle Brake Performance** *Jiantao Wang, Bo Yang, Jialiang Liu, Kangping Ji, Qilu Wang, Wuhan University of Technology*
4:00 p.m.	2017-01-0094	**Path Tracking Using Fractional Order Extremum Seeking Controller for Autonomous Ground Vehicle** *Soodeh Dadras, Utah State University*

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Wednesday, April 5

Engine & Transmission Control

Session Code: ***AE301***

Room 359 ***Session Time: 8:00 a.m.***

Powertrain Electronics play a key role in meeting today's complex emissions and performance requirements, on-board diagnostics, legislated regulations, and product flexibility. This session explores the challenges and future prospects for powertrain controls, including on-board diagnostics, integration with transmissions, flash programming, service, software design and development, unit and system test, and electronics architecture today and in the future.

Organizers - *Brian A. Trimboli, IAV Automotive Engineering Inc.*

Chairpersons - *Kevin Sittner, IAV Automotive Engineering Inc.*

Time	Paper No.	Title

8:00 a.m.	***2017-01-1628***	***ECU Structure Strategy to Detect Lift Timing of GDI Solenoid Injectors with High Precision*** *Atsushi Ito, Masahiro Kawano, Shohei Fujita, DENSO Corporation*
8:30 a.m.	***2017-01-1629***	***Time to Torque Optimization by Evolutionary Computation Methods*** *Jing Wang, John Michelini, Yan Wang, Michael H. Shelby, Ford Motor Company*
9:00 a.m.	***2017-01-1631***	***A Sensorless Control Solution for DCT Oil Pump with BLDC Motor*** *Weizhe Qian, Henry Zhang, Infineon Technologies China Co. Ltd.*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1632***	***Development of New Shift Control System using a Model-based Control Method for Toyota Stepped Automatic Transmissions*** *Norihiro Tsukamoto, Tomohiro Chimbe, Tomohiro Asami, Keisuke Ota, Seiji Masunaga, Toyota Motor Corporation*

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Wednesday, April 5

Wiring and Harnesses

Session Code: ***AE303***

Room 359 ***Session Time:*** ***1:00 p.m.***

This session deals with the electrical distribution system (EDS), increasing content/complexity, and the optimization of the systems in vehicles. The EDS is the nerve system of the vehicle and is far reaching into all areas of the architecture. This session will review the associated components for the wiring systems: wiring/cables, connectors, harnesses, fuse & relay boxes, etc., and will discuss new technologies that are emerging to address mega trends.

Organizers - *Kirk Rasmussen, Leoni Wiring Systems Inc.; Lyle Stanley Bryan, TE Connectivity; J. Howard Evans, Bentley Motors, Ltd.; Abraham Shocket, TE Connectivity; Aaron Steffka, Sumitomo Electric Wiring Systems*

Chairpersons - *Kirk Rasmussen, Leoni Wiring Systems Inc.*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1641***	***Model-Based Circuit Protection Using Solid State Switches*** *Ludwig Brabetz, University of Kassel; Mohamed Ayeb, Universitaet Kassel; Leonard Gysen, Kassel University*
1:30 p.m.	***2017-01-1645***	***Aluminum Cable Automotive Harness â€Openâ€™Crimp Termination Functionality Across the Al Cable Size Ranges (small, mid, large)*** *Marjorie Myers, TE Connectivity*
2:00 p.m.	***2017-01-1646***	***Electrical Crimp Consolidation*** *David B. Sarraf, Helge Schmidt, TE Connectivity*
2:30 p.m.		***BREAK***
3:00 p.m.	***ORAL ONLY***	***Copper Clad Aluminium by Magnetic Pulse Crimping*** *Adrien Laurino, Leoni Wiring Systems France*
3:30 p.m.	***ORAL ONLY***	***Acoustic Computation of a Wiring Grommet in a Small Cabin using Finite Element Analysis*** *Martin Garot, Nicolas Merlette, CEVAA; Federico Cabrera, Leoni AG*

4:00 p.m.	***2017-01-1643***	***Non-Contact Measurement Method for High Frequency Impedance of Load at the End of Wire Harness*** *Makoto Tanaka, Yasunori Oguri, Michihira Iida, DENSO Corporation; Chihiro Yoshikawa, Jianging Wang, Nagoya Institute of Technology*
4:30 p.m.	***2017-01-1644***	***Development of High Strength Aluminum Wires for Low-Voltage Automotive Wiring Harnesses*** *Kinji Taguchi, AutoNetworks Technologies, Ltd.; Misato kusakari, Sumitomo Electric Industries, Ltd.; Yasuhiro Akasofu, Sumitomo Electric Toyama Co. Ltd.; Jun Yoshimoto, Sumitomo Wiring Systems, Ltd.*
5:00 p.m.	***2017-01-1642***	***Influence of Assembly Speed on Electrical Connector Mating Force*** *Don Price, USCAR*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Wednesday, April 5

Electric Motor & Power Electronics (Part 3 of 5)

Session Code: ***PFL740***

Room 410 B ***Session Time:*** ***8:00 a.m.***

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification.

Organizers - *John Czubay, General Motors; Laura Marlino, Oak Ridge National Laboratory; Constantine N. Raptis, GM Powertrain; Serdar Yonak, Ford Motor Company*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1247***	***Traction Inverter Design with a Direct Bypass to Boost Converter*** *Mohammed Khorshed Alam, Lihua Chen, Yan Zhou, Fan Xu, Shuitao Yang, Ford Motor Company*
8:30 a.m.	***2017-01-1224***	***Development of Fuel Cell Boost Converter Using Coupled-Inductor for New FCV*** *Ryota Kitamoto, Honda R&D Co., Ltd.; Shinnosuke Sato, Hiromichi Nakamura, Atsushi Amano, Honda R&D Co Ltd*
9:00 a.m.	***2017-01-1234***	***DC-Link Capacitor Sizing Considerations for HEV/EV e-Drive Systems*** *Srikanthan Sridharan, Joseph Kimmel, Jun Kikuchi, Ford Motor Company*
9:30 a.m.	***2017-01-1239***	***Electromigration of Ni Plating/Sn-0.7Cu Based Joint System of Power Modules for Hybrid Vehicles*** *Naoya Take, Takuya Kadoguchi, Masao Noguchi, Toyota Motor Corporation; Kimihiro Yamanaka, Chukyo University*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1246***	***Power Module Design Verification for xEV Application Under Extreme Conditions*** *Fan Xu, Lihua Chen, Shuitao Yang, Yan Zhou, Mohammed Khorshed Alam, Ford Motor Company*
11:00 a.m.	***2017-01-1244***	***Development of New IGBT to Reduce Electrical Power Losses and Size of Power Control Unit for Hybrid Vehicles*** *Keisuke Kimura, Tasbir Rahman, Tadashi Misumi, Takeshi Fukami, Masafumi Hara, Toyota Motor Corporation; Sachiko Kawaji, Satoru Machida, Toyota Central R&D Labs Inc*

11:30 a.m.	***2017-01-1248***	***Opportunity and Challenges for SiC-Based HEV Traction Inverter Systems*** *Ming Su, Chingchi Chen, Krishna Prasad Bhat, Jun Kikuchi, Shrivatsal Sharma, Thomas Lei, Ford Motor Company*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Electric Motor & Power Electronics (Part 4 of 5)

Session Code: ***PFL740***

Room 410 B ***Session Time:*** ***1:30 p.m.***

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification.

Organizers - *John Czubay, General Motors; Laura Marlino, Oak Ridge National Laboratory; Constantine N. Raptis, GM Powertrain; Serdar Yonak, Ford Motor Company*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-1220***	***Effect of Magnet Temperature on Optimal Current Control Trajectory of an Interior PM Synchronous Machines*** *Ahmad Arshan Khan, Ford Motor Company*
2:00 p.m.	***2017-01-1227***	***Effect of the Variable Switching Frequency and DPWM Switching Schemes on the Losses of Traction Drives*** *Ali Najmabadi, Michael Kress, Brett Dryer, Ahmad Arshan Khan, Ford Motor Company*
2:30 p.m.	***2017-01-1235***	***Pole-Phase Modulation Motor Drive to Extend Torque-Speed Capacity for xEV Applications*** *Baoming Ge, Lihua Chen, Shuitao Yang, Ford Motor Company*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-1236***	***Switching Frequency Optimization of Boost Converter for HEV Applications*** *Shuitao Yang, Lihua Chen, Mohammed Khorshed Alam, Fan Xu, Yan Zhou, Ford Motor Company*
4:00 p.m.	***2017-01-1243***	***A Smart Gate Driver with Active Switching Speed Control for Traction Inverters*** *Yan Zhou, Lihua Chen, Shuitao Yang, Fan Xu, Mohammed Khorshed Alam, Ford Motor Company*
4:30 p.m.	***2017-01-1223***	***Study on the Effect of Inverter Modulation Methods and Operating Condition on Common Mode EMI for Motor Drive System*** *Ji Zhang, Mengjing Shen, Xi Zhao, Tongji University*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Combustion in Gaseous-Fueled Engines (Part 1 of 2)

Session Code: ***PFL270***

Room 411 A ***Session Time:*** ***8:00 a.m.***

This session focuses on fuel injection, combustion, controls, performance and emissions of SI engines fueled with gaseous fuels such as methane, natural gas (NG), biogas, producer gas, coke oven gas, hydrogen, or hydrogen-NG blends. Papers on Diesel-NG or diesel-hydrogen dual-fuel engines will also be accepted in this session.

Organizers - *Chris Hagen, Oregon State Univ.; Victor Salazar, GE Global Research Center; Riccardo Scarcelli, Thomas Wallner, Argonne National Laboratory*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0776***	***Methane Number Effect on the Efficiency of a Downsized, Dedicated, High Performance Compressed Natural Gas (CNG) Direct Injection Engine*** *Ulrich Kramer, Thomas Lorenz, Christian Hofmann, Helmut Ruhland, Rolf Klein, Carsten Weber, Ford Motor Company*
8:30 a.m.	***2017-01-0782***	***Improvement in Thermal Efficiency of Lean Burn Pre-Chamber Natural Gas Engine by Optimization of Combustion System*** *Qian xiong, Yasuo Moriyoshi, Koji Morikawa, Yasushi takahashi, Tatsuya Kuboyama, Toshio Yamada, Chiba University*
9:00 a.m.	***2017-01-0780***	***Calculations and Test Measurements of In-Cylinder Combustion Velocity of Hydrogen - Air Mixtures Considering the Effect of Flame Instability*** *Dongwei Wu, Beijing Institute of Technology; Baigang Sun, Collabor. Innov. Center of EV in Beijing; Qinghe Luo, Xi Wang, Yunshan Ge, Beijing Institute of Technology*
9:30 a.m.	***2017-01-0775***	***Measured and Predicted Performance of a Downsized, Medium Duty, Natural Gas Engine*** *Robert Draper, Brendan Lenski, Franz-Joseph Foltz, Roderick Beazley, William Tenny, Westport Fuel Systems*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0779***	***The Impact of a Combustion Chamber Optimization on the Mixture Formation and Combustion in a CNG-DI Engine in Stratified Operation*** *Wolfgang Friedrich, Roman Grzeszik, Philipp Lauschke, Vadim Zelenov, Robert Bosch GmbH; Michael Wensing, University of Erlangen-Nuremberg*
11:00 a.m.	***2017-01-0781***	***Spark Ignited Direct Injection Natural Gas Combustion in a Heavy Duty Single Cylinder Test Engine - Nozzle Included Angle Effects*** *Philip Zoldak, Jeffrey Naber, Michigan Technological University*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Combustion in Gaseous-Fueled Engines (Part 2 of 2)

Session Code: ***PFL270***

Room 411 A ***Session Time:*** ***1:30 p.m.***

This session focuses on fuel injection, combustion, controls, performance and emissions of SI engines fueled with gaseous fuels such as methane, natural gas (NG), biogas, producer gas, coke oven gas, hydrogen, or hydrogen-NG blends. Papers on Diesel-NG or diesel-hydrogen dual-fuel engines will also be accepted in this session.

Organizers - *Chris Hagen, Oregon State Univ.; Victor Salazar, GE Global Research Center; Riccardo Scarcelli, Thomas Wallner, Argonne National Laboratory*

Time	Paper No.	Title

1:30 p.m.	***2017-01-0777***	***Impacts and Mitigation of Varying Fuel Composition in a Natural Gas Heavy-Duty Engine*** *Gordon McTaggart-Cowan, Jian Huang, Sandeep Munshi, Westport Fuel Systems*
2:00 p.m.	***2017-01-0783***	***Investigations of the Effect of Humid Air on NOx and PM Emissions of a CNG Engine*** *Hamid R. Rahai, Yong Lee, California State University; Najmeh rahimi, Siemens; Komal Gada, California State University*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Partially Premixed Compression Ignition, PPCI (Part 3 of 3)

Session Code: ***PFL250***

Room 411 B ***Session Time:*** ***8:00 a.m.***

Mixed mode with auto ignition but inhomogeneous charge. Injection-controlled but with EOI before SOC. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, combustion control, and PPC injection strategies are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL110 or PFL120 modeling sessions.

Organizers - *Adam B. Dempsey, Caterpillar; Antonio Garcia, CMT Motores Termicos Universidad; Bengt Johansson, King Abdullah Univ. of Science & Tech.; Derek Splitter, Oak Ridge National Laboratory*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0752***	***Optical Study of Fuel Spray Penetration and Initial Combustion Location under PPC Conditions*** *Sara Lonn, Alexios Matamis, Martin Tuner, Mattias Richter, Oivind Andersson, Lund University*
8:30 a.m.	***2017-01-0748***	***Transition from HCCI to PPC: Investigation of Fuel Distribution by Planar Laser Induced Fluorescence (PLIF)*** *Zhenkan Wang, Sara Lonn, Alexios Matamis, Oivind Andersson, Martin Tuner, Marcus Alden, Mattias Richter, Lund University*
9:00 a.m.	***2017-01-0753***	***Effects of Post-Injections Strategies on UHC and CO at Gasoline PPC Conditions in a Heavy-Duty Optical Engine*** *Marcus Olof Lundgren, Zhenkan Wang, Alexios Matamis, Oivind Andersson, Mattias Richter, Martin Tuner, Marcus Alden, Lund University; Andersson Arne, Volvo AB*
9:30 a.m.	***2017-01-0747***	***Characterization of Hydrocarbon Emissions from Gasoline Direct-Injection Compression Ignition Engine Operating on a Higher Reactivity Gasoline Fuel*** *John Storey, Samuel Lewis, Melanie Moses-DeBusk, Raynella Connatser, Oak Ridge National Laboratory; Jong Lee, Tom Tzanetakis, Kukwon Cho, Matthew Lorey, Aramco Research Center; Mark Sellnau, Delphi Automotive Systems LLC*
10:00 a.m.		***BREAK***

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

SI Combustion Ignition (Part 2 of 2)

Session Code: ***PFL215*** ***1:30 p.m.***

Room 411 B ***Session Time:***

This session focuses on the SI combustion ignition process and advanced ignition systems. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation.

Organizers - *William P. Attard, Matthew Bresler, FCA US LLC; Ryan J. Chemiak, Richard S. Davis, General Motors LLC*

Chairpersons - *Matthew Bresler, FCA US LLC; Adrian Irimescu, Istituto Motori CNR*

Time	Paper No.	Title
2:00 p.m.	2017-01-0672	**An Experimental Study on the Interaction between Flow and Spark Plug Orientation on Ignition Energy and Duration for Different Electrode Designs** *Yanyu Wang, Jiongxun Zhang, Paul Dice, Xin Wang, Mahdi Shahbakhti, Jeffrey Naber, Michigan Technological University; Michael Czekala, Qiuping Qu, Garlan Huberts, Ford Motor Company*
2:30 p.m.	2017-01-0677	**Combined Effects of Spark Discharge Pattern and Tumble Level on Cycle-to-Cycle Variations of Combustion at Lean Limits of SI Engine Operation** *Dongwon Jung, Kosaku Sasaki, Kenji Sugata, Masayoshi Matsuda, Takeshi Yokomori, Norimasa Iida, Keio University*
3:00 p.m.		**BREAK**
3:30 p.m.	2017-01-0678	**Improvement on Energy Efficiency of the Spark Ignition System** *Xiao Yu, Shui Yu, University of Windsor; Zhenyi Yang, Engine and Equipment; Qingyuan Tan, Mark Ives, University of Windsor; Liguang Li, Tongji University; Mengzhu Liu, Tongxin Auto Parts Ltd.; Ming Zheng, University of Windsor*
4:00 p.m.	2017-01-0680	**Investigation of Impacts of Spark Plug Orientation on Early Flame Development and Combustion in a DI Optical Engine** *Yanyu Wang, Jiongxun Zhang, Xin Wang, Paul Dice, Mahdi Shahbakhti, Jeffrey Naber, Michigan Technological University; Michael Czekala, Qiuping Qu, Garlan Huberts, Ford Motor Company*
4:30 p.m.	2017-01-0679	**Investigation of Multi-Pole Spark Ignition Under Lean Conditions and with EGR** *Kelvin Xie, Shui Yu, Xiao Yu, Geraint Bryden, Ming Zheng, University of Windsor; Mengzhu Liu, Tongxin Auto Parts Ltd.*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Dual Fuel Combustion (Part 3 of 4)

Session Code: ***PFL260***

Room 411 C ***Session Time:*** ***8:30 a.m.***

Mixed mode using more than one fuel not fully mixed before combustion. Most often with auto ignition of spray injected late. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, and RCCI (Reactivity-Controlled Compression Ignition) are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL110 or PFL120 modeling sessions.

Organizers - *Scott Curran, Oak Ridge National Laboratory; Antonio Garcia, CMT Motores Termicos Universidad; Andrew Ickes, Argonne National Laboratory; Sage Kokjohn, Univ. of Wisconsin Madison; Benjamin Lawler, Stony Brook Univ.; Eric Jon Nafziger, Oak Ridge National Laboratory; William F. Northrop;*

Martin Wissink, Oak Ridge National Laboratory

Time	Paper No.	Title
8:30 a.m.	**2017-01-0762**	***Study of Heat Release Shaping via Dual-Chamber Piston Bowl Design to Improve Ethanol-Diesel Combustion Performance*** *Xiaoye Han, Prasad Divekar, Meiping Wang, Ming Zheng, Jimi Tjong, University of Windsor; William De Ojeda, WM International Engineering*
9:00 a.m.	**2017-01-0770**	***A Feasibility Study of Using DI Butanol as an Ignition Source for Dual-Fuel Combustion*** *Tongyang Gao, Shui Yu, Hua Zhu, University of Windsor; Tie Li, Shanghai Jiao Tong University; Jimi Tjong, Graham Reader, Ming Zheng, University of Windsor*
9:30 a.m.	**2017-01-0768**	***Investigation on Electronic Assisted Primary Fuel Injection of Compression Ignition Engine Fueled with Waste Cooking Oil as Pilot Fuel for Improved Part Load Efficiency and Effective Waste Utilization*** *Sasikumar Nandagopal, Senthil Kumar Masimalai, Arul Selvan Subramaniyan, MIT, Anna University, Chennai,India; JaiKumar Mayakrishnan, Hindustan University,Chennai,India*
10:00 a.m.		***BREAK***
10:30 a.m.	**2017-01-0771**	***Mode Switching to Improve Low Load Efficiency of an Ethanol-Diesel Dual-Fuel Engine*** *Prasad Divekar, Xiaoye Han, Qingyuan Tan, Usman Asad, Tadanori Yanai, Xiang Chen, Jimi Tjong, Ming Zheng, University of Windsor*
11:00 a.m.	**2017-01-0767**	***Real-Time Closed-Loop Control of a Light-Duty RCCI Engine During Transient Operations*** *Jayant Kumar Arora, Mahdi Shahbakhti, Michigan Technological University*
11:30 a.m.	**2017-01-0754**	***Experimental Study on High-Load Extension of Gasoline/PODE Dual-Fuel RCCI Operation Using Late Intake Valve Closing*** *Hu Wang, Laihui Tong, Zunqing Zheng, Tianjin University; Mingfa Yao, Tianjin Univ.*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Dual Fuel Combustion (Part 4 of 4)

Session Code: ***PFL260***

Room 411 C ***Session Time:*** ***1:30 p.m.***

Mixed mode using more than one fuel not fully mixed before combustion. Most often with auto ignition of spray injected late. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, and RCCI (Reactivity-Controlled Compression Ignition) are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL110 or PFL120 modeling sessions.

Organizers - *Scott Curran, Oak Ridge National Laboratory; Antonio Garcia, CMT Motores Termicos Universidad; Andrew Ickes, Argonne National Laboratory; Sage Kokjohn, Univ. of Wisconsin Madison; Benjamin Lawler, Stony Brook Univ.; Eric Jon Nafziger, Oak Ridge National Laboratory; William F. Northrop; Martin Wissink, Oak Ridge National Laboratory*

Time	Paper No.	Title

1:30 p.m.	***2017-01-0757***	***Exploration of Dual Fuel Diesel Engine Operation with On-Board Fuel Reforming*** *Jeffrey Hwang, Xuesong Li, William Northrop, University of Minnesota*
2:00 p.m.	***2017-01-0761***	***Investigation of Steady-State RCCI Operation in a Light-Duty Multi-Cylinder Engine Using â€œDieselineâ€*** *Christopher W. Gross, Engine Research Center UW Madison; Rolf Reitz, Univ of Wisconsin*
2:30 p.m.	***2017-01-0758***	***Comparing the Exergy Destruction of Methanol and Gasoline in Reactivity Controlled Compression Ignition (RCCI) Engine*** *Yaopeng Li, Ming Jia, Yachao Chang, Guangfu Xu, Dalian University of Technology*
3:00 p.m.		***BREAK***
3:30 p.m.	***ORAL ONLY***	***Performance and emissions of RCCI with iso-octane and n-heptane on a light-duty multi-cylinder engine*** *Martin Wissink, Scott Curran, Oak Ridge National Laboratory*
4:00 p.m.	***2017-01-0773***	***The Effects of Charge Preparation, Fuel Stratification, and Premixed Fuel Chemistry on Reactivity Controlled Compression Ignition (RCCI) Combustion*** *Dan DelVescovo, Oakland University; Sage Kokjohn, Rolf Reitz, University of Wisconsin*
4:30 p.m.	***2017-01-0765***	***Experimental Investigation of Improving Homogeneous Charge Induced Ignition (HCII) Combustion at Medium and High Load by Reducing Compression Ratio*** *Shuojin Ren, Boyuan Wang, Jianhua Xiao, Haoye Liu, Zhi Wang, Jianxin Wang, Tsinghua University; Chuandong Li, Qingpeng Zhang, Yantai University*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

0-D and 1-D Modeling and Numerics (Part 2 of 6) - Models for SI Combustion and Emissions (Part 1 of 2)

Session Code: ***PFL110***

Room 412 A ***Session Time:*** ***8:00 a.m.***

Separate sub-sessions cover zero-dimensional, one-dimensional, and quasi-dimensional models for simulation of SI and CI engines with respect to: engine breathing, boosting, and acoustics; SI combustion and emissions; CI combustion and emissions; fundamentals of engine thermodynamics; numerical modeling of gas dynamics; thermal management; mechanical and lubrication systems; system level models for controls; system level models for vehicle fuel economy and emissions predictions.

Organizers - *Federico Millo, Politecnico di Torino; Angelo Onorati, Politecnico di Milano; Christof Schernus, FEV Europe GmbH; Xiaofeng Yang, General Motors LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0524***	***A 1-D Platform to Simulate the Effects of Dedicated EGR on SI Engine Combustion*** *Lei Liang, Huaqi Ge, Haiwen Ge, Peng Zhao, Oakland University*
8:30 a.m.	***2017-01-0545***	***Correlation between Simulated Volume Fraction Burned Using a Quasi-Dimensional Model and Flame Area Measured in an Optically Accessible SI Engine*** *Adrian Irimescu, Silvana Di Iorio, Simona Silvia Merola, Paolo Sementa, Bianca Maria Vaglieco, Istituto Motori CNR*

9:00 a.m.	***2017-01-0542***	***Development of a <italic>K</italic>-<italic>k</italic>-<italic>âŠ</italic> Phenomenological Model to Predict In-Cylinder Turbulence*** *Navin Fogla, Michael Bybee, Gamma Technologies LLC; Mohsen Mirzaeian, Federico Millo, Politecnico di Torino; Syed Wahiduzzaman, Gamma Technologies LLC*
9:30 a.m.	***2017-01-0518***	***Influence of Binary CNG Substitute Composition on the Prediction of Burn Rate, Engine Knock and Cycle-to-Cycle Variations*** *Sebastian Hann, Lukas Urban, Michael Grill, FKFS; Michael Bargende, IVK, University of Stuttgart*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0525***	***A Study on the Refinement of Turbulence Intensity Prediction for the Estimation of In-Cylinder Pressure in a Spark-Ignited Engine*** *Namho Kim, Joohan Kim, Insuk Ko, Seoul National University; Hoimyung Choi, Advanced Institutes of Convergence Technology; Kyoungdoug Min, Seoul National University*
11:00 a.m.	***2017-01-0519***	***Modeling and Numerical Investigation of Auto-Ignition and Megaknock in Boosted Gasoline Engines*** *Maziar Khosravi, Ford-Werke GmbH; Aadinath Harihar, Heinz Pitsch, RWTH University; Carsten Weber, Ford-Werke GmbH*
11:30 a.m.	***2017-01-0540***	***Experimental and Numerical Study of the Water Injection to Improve the Fuel Economy of a Small Size Turbocharged SI Engine*** *Vincenzo De Bellis, University of Naples - Federico II; Fabio Bozza, Luigi Teodosio, University of Naples; Gerardo Valentino, Istituto Motori, CNR*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

0-D and 1-D Modeling and Numerics (Part 2 of 6) - Models for SI Combustion and Emissions (Part 2 of 2)

Session Code: ***PFL110***

Room 412 A ***Session Time:*** ***1:30 p.m.***

Separate sub-sessions cover zero-dimensional, one-dimensional, and quasi-dimensional models for simulation of SI and CI engines with respect to: engine breathing, boosting, and acoustics; SI combustion and emissions; CI combustion and emissions; fundamentals of engine thermodynamics; numerical modeling of gas dynamics; thermal management; mechanical and lubrication systems; system level models for controls; system level models for vehicle fuel economy and emissions predictions.

Organizers - *Federico Millo, Politecnico di Torino; Angelo Onorati, Politecnico di Milano; Christof Schernus, FEV GmbH; Xiaofeng Yang, General Motors LLC*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0538***	***Engine Knock Prediction and Evaluation Based on Detonation Theory Using a Quasi-Dimensional Stochastic Reactor Model*** *Corinna Netzer, Lars Seidel, Michal Pasternak, Brandenburg University of Technology; Christian Klauer, Cathleen Perlman, LOGE AB; Frederic Ravet, Renault; Fabian Mauss, Brandenburg University of Technology*
2:00 p.m.	***2017-01-0539***	***Development of Laminar Burning Velocity Correlation for the Simulation of Methanol Fueled SI Engines Operated with Onboard Fuel Reformer*** *Duc-Khanh Nguyen, Sebastian Verhelst, Ghent University*

2:30 p.m.	***2017-01-0529***	***Investigation of Species from Negative Valve Overlap Reforming Using a Stochastic Reactor Model*** *Seamus Kane, Xuesong Li, University of Minnesota; Benjamin Wolk, Isaac Ekoto, Sandia National Laboratories; William F. Northrop, University of Minnesota*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

0-D and 1-D Modeling and Numerics (Part 6 of 6) General Thermodynamics & Fundamentals

Session Code: ***PFL110***

Room 412 A ***Session Time:*** ***3:30 p.m.***

Separate sub-sessions cover zero-dimensional, one-dimensional, and quasi-dimensional models for simulation of SI and CI engines with respect to: engine breathing, boosting, and acoustics; SI combustion and emissions; CI combustion and emissions; fundamentals of engine thermodynamics; numerical modeling of gas dynamics; thermal management; mechanical and lubrication systems; system level models for controls; system level models for vehicle fuel economy and emissions predictions.

Organizers - *Kevin L. Hoag, Southwest Research Institute; Federico Millo, Politecnico di Torino; Christof Schernus, FEV Europe GmbH*

Time	***Paper No.***	***Title***
3:30 p.m.	***2017-01-0521***	***Validation of an Organic Rankine Cycle Simulation Tool against European Stationary Cycle Test Modes*** *Richard Merrett, John Murray, Doug Kolak, Mentor Graphics Corp.*
4:00 p.m.	***2017-01-0515***	***Studying the Effect of the Flame Passage on the Convective Heat Transfer in a S.I. Engine*** *Thomas De Cuyper, Stijn Broekaert, Duc-Khanh Nguyen, Ghent University; Kam Chana, University of Oxford; Michel De Paepe, Sebastian Verhelst, Ghent University*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Driveline NVH

Session Code: ***PFL660***

Room 412 B ***Session Time:*** ***8:00 a.m.***

This session addresses transmission noise, vibration, rattle issues and design solutions.

Organizers - *Fabio Da Silva Ferreira, TUV Nord Mobility; Michael E. Fingerman, FCA US LLC; Darrell Robinette, General Motors LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1121***	***Ting Noise Generation in Automotive Applications*** *Deb Bonnerjee, Djamel Bouzit, Javed Iqbal, Ford Motor Company*
8:30 a.m.	***2017-01-1125***	***Geometrical Optimization of an Automotive Halfshaft*** *Victor Baumhardt, Valdinei Sczibor, Ford Motor Company*
9:00 a.m.	***2017-01-1120***	***New Hybrid Genetic Algorithm for Pitch Sequence Optimization of CVT Variator Chain*** *Kenji Tsutsumi, Yoshitaka Miura, Yusuke Kageyama, Nissan Motor Co., Ltd.; Arata Miyauchi, ESTECH Corp.*

9:30 a.m.	***2017-01-1124***	***A Theoretical Investigation of the Influence of Powertrain Mounts on Transmission Torsional Dynamics*** *Enrico Galvagno, Pablo Gutierrez, Mauro Velardocchia, Alessandro Vigliani, Politecnico di Torino*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1122***	***Gear Whine Noise Due to Deformation- A Case Study*** *Yashodhan V. Joshi, Cummins Inc.*
11:00 a.m.	***2017-01-1126***	***Longitudinal Vibration Analysis of Electric Wheel System in Starting Condition*** *Yu Mao, Shuguang Zuo, Xudong Wu, Tongji University*
11:30 a.m.	***2017-01-1123***	***Simulations on Special Structure ISG Motor Used for Hybrid Electrical Vehicles Aimed at Active Damping*** *Jinyu Zhang, Yaodong Hu, Fuyuan Yang, Chao Xu, Tsinghua University*

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

IVT / CVT

Session Code: ***PFL630***

Room 412 B ***Session Time:*** ***2:00 p.m.***

This Session includes papers on IVT/CVT systems and related topics.

Organizers - *Joel Gunderson, Farzad Samie, General Motors LLC*

Time	***Paper No.***	***Title***
2:00 p.m.	***2017-01-1106***	***Strain Analysis of Belt Element-Pulley Interaction of an Automobile CVT under Actual Vehicle Speed Condition*** *Yuki Ono, Kenji Matsumoto, Honda R&D Co., Ltd.; Yuji Mihara, Tokyo City University*
2:30 p.m.	***2017-01-1104***	***Control of Gear Ratio and Slip in Continuously Variable Transmissions: A Model Predictive Control Approach*** *William D. Dunham, Jinwoo Seok, University of Michigan; Weitian Chen, Edward Dai, Ford Motor Company; Ilya Kolmanovsky, Anouck Girard, University of Michigan*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-1105***	***Analysis of Methods for Solution of Differential Equations of Motion of Inertial Continuously Variable Transmissions*** *Sergei Aliukov, Alexander Alyukov, South Ural State University*
4:00 p.m.	***2017-01-1103***	***Inertia Continuously Variable Transmissions and Investigation of their Dynamics*** *Sergei Aliukov, Andrei Keller, Alexander Alyukov, South Ural State University*

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Emission Control Modeling (Part 2 of 4)

Session Code: ***PFL430***

Room 413 A ***Session Time:*** ***8:00 a.m.***

This technical session addresses exhaust aftertreatment system models, as well as their validation and application. Technologies encompassed include DOC, HC Trap, DPF, GPF, LNT, TWC, SCR, SCRF, ammonia oxidation catalysts, hybrid or combined catalysts, urea-water solution spray dynamics, and mixture non-uniformity. Modeling aspects range from fundamental 3-D models of individual components to system level simulation and optimization.

Organizers - *Christopher Depcik, Univ. of Kansas; Maruthi Devarakonda, General Electric Company; Thomas McKinley, Cummins Inc.; Vincenzo Mulone, Univ. Of Roma Tor Vergata; Achuth Munnannur, Cummins Inc.; Balaji Sukumar, Johnson Matthey ECT*

Chairpersons - *Susan E. Brasmer, Cummins Inc.*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0964***	***Numerical analysis of Urea-SCR sprays under cross-flow conditions*** *Jakob Heide; Mikael Karlsson, KTH CCGEx; Mireia Altimira, Kungliga Tekniska Hogskola*
8:30 a.m.	***2017-01-0965***	***Quantitative Analysis of Low Pressure-Driven Spray Mass Distribution and Liquid Entrainment for SCR Application through a Mechanical Patternator*** *Lorenzo Nocivelli, Gianluca Montenegro, Angelo Onorati, Francesco Curto, Politecnico di Milano; Panayotis Dimopoulos Eggenschwiler, Yujun Liao, Alexander Vogel, EMPA*
9:00 a.m.	***2017-01-0972***	***NO₂/NOx Ratio and NH₃ Storage Estimation of Automotive SCR Multi-Brick Systems*** *Jiri Figura, Jaroslav Pekar, Pavel Krejza, David Mracek, Honeywell Automotive Software; Dirk von Wissel, Tianran Zhang, Renault SA*
9:30 a.m.	***2017-01-0963***	***Limitations of Real-Time Engine-Out NOx Estimation in Diesel Engines*** *Hoon Cho, Thomas Brewbaker, Devesh Upadhyay, Brien Fulton, Michiel Van Nieuwstadt, Ford Motor Company*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0968***	***Development of a Kinetic Model to Evaluate Water Storage on Commercial Cu-Zeolite SCR Catalysts during Cold Start*** *Anand Srinivasan, Saurabh Joshi, Yadan Tang, Di Wang, Neal Currier, Aleksey Yezerets, Cummins Inc.*
11:00 a.m.	***2017-01-0973***	***Numerical Study of Catalytic Reaction Mechanisms of Urea SCR*** *Naoko Uchiumi, Hiroshi Hirabayashi, Shinya Sato, Hino Motors Ltd.; Takafumi Yamauchi, Toyota Central R&D Labs Inc.*
11:30 a.m.	***2017-01-0976***	***A Review of the Literature on Modelling of Integrated SCR-in-DPF Systems*** *Seun Olowojebutu, Thomas Steffen, Loughborough Univ.*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Emission Control Modeling (Part 3 of 4)

Session Code: ***PFL430*** ***1:30 p.m.***

Room 413 A ***Session Time:***

This technical session addresses exhaust aftertreatment system models, as well as their validation and application. Technologies encompassed include DOC, HC Trap, DPF, GPF, LNT, TWC, SCR, SCRF, ammonia oxidation catalysts, hybrid or combined catalysts, urea-water solution spray dynamics, and mixture non-uniformity. Modeling aspects range from fundamental 3-D models of individual components to system level simulation and optimization.

Organizers - *Christopher Depcik, Univ. of Kansas; Maruthi Devarakonda, General Electric Company; Thomas McKinley, Cummins Inc.; Vincenzo Mulone, Univ. Of Roma Tor Vergata; Achuth Munnannur, Cummins Inc.; Balaji Sukumar, Johnson Matthey ECT*

Chairpersons - *Susan E. Brasmer, Cummins Inc.*

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	**Filter Wall Representation and Deep Bed Filtration Modeling based on Constricted Tube Collector** *Yangdongfang Yang, Christopher Rutland, Univ of Wisconsin Madison*
2:00 p.m.	2017-01-0967	**A Modeling Analysis of Fibrous Media for Gasoline Particulate Filters** *Xin Liu, Jeong Kim, Timothy Chanko, Christine Lambert, James Pakko, Ford Motor Company*
2:30 p.m.	2017-01-0971	**Modeling Approach for a Wiremesh Substrate in CFD Simulation** *Uladzimir Budziankou, Thomas Lauer, Xuehai Yu, Vienna University of Technology; Brian M Schmidt, Nam Cho, John Deere Power Systems*
3:00 p.m.		**BREAK**
3:30 p.m.	2017-01-0978	**Assessment of Light Duty Diesel After-Treatment Technology Targeting Beyond Euro 6d Emissions Levels** *Andrew Auld, Andrew Ward, Kenan Mustafa, Benjamin Hansen, Ricardo UK Ltd.*
4:00 p.m.	2017-01-0970	**Particulate Matter Classification in Filtration and Regeneration-Plant Modeling for SiL and HiL Environment** *Johann C. Wurzenberger, Christoph Triebl, Susanne Kutschi, Christoph Poetsch, AVL LIST GmbH*
4:30 p.m.	2017-01-0974	**Development of a Particulate Filter Model for the Prediction of Backpressure: Improved Momentum Balance and Entrance and Exit Effect Equations** *Timothy C. Watling, Maya R. Ravenscroft, Johnson Matthey Technology Centre; Jason P.E. Cleeton, Ian D. Rees, David A.R. Wilkins, Johnson Matthey ECT*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Advanced Battery Technologies (Part 3 of 6)

Session Code: ***PFL730***

Room 413 B ***Session Time:*** ***8:00 a.m.***

The success of HEV's, PHEV's & EV's is highly dependent on their batteries. This session focuses on advanced battery technologies, including, but not limited to: advanced materials and cell chemistries, battery management systems and controls, modeling, testing, diagnosis and health monitoring, safety, reliability, durability, battery charging, battery economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, module, pack or vehicle levels.

Organizers - *Wayne Cai, General Motors; Yi Ding, RDECOM-TARDEC; James Miller, Argonne National Laboratory; Ramesh Rebba, General Motors LLC*

Time	Paper No.	Title
8:00 a.m.	2017-01-1193	**CAE Method for Evaluating Mechanical Performance of Battery Packs under Mechanical Shock Testing** *Yongcai Wang, Rajaram Subramanian, Sarav Paramasivam, George Garfinkel, Ford Motor Company*
8:30 a.m.	2017-01-1190	**Thermoplastic Enclosure for a High Voltage Battery System** *Patrick Maguire, Hyung Baek, Stephen Liptak, Olivia Lomax, Rodolfo Palma, Yi Zhang, Ford Motor Company*
9:00 a.m.	2017-01-1191	**Online Capacity Estimation for Automotive Lithium-Ion Cells Incorporating Temperature-Variation and Cell-Aging** *Patrick Wesskamp, Simon Reitemeyer, Joachim Melbert, Ruhr-University Bochum*
9:30 a.m.	2017-01-1194	**A Study of Parameter Inconsistency Evolution Pattern in Parallel-Connected Battery Modules** *Qiaohua Fang, Xuezhe Wei, Haifeng Dai, Tongji University*
10:00 a.m.		**BREAK**
10:30 a.m.	2017-01-1195	**Impact of Manual Service Disconnect in an Automotive Traction Battery System (RESS)** *Masahiro Kimoto, Ford Motor Company*
11:00 a.m.	2017-01-1192	**Model-Based Adaptive Fault Diagnosis in Lithium Ion Batteries: A Comparison of Linear and Nonlinear Approaches** *Amardeep Sidhu, Afshin Izadian, Indiana Univ Purdue Univ Indianapolis; Sohel Anwar, Indiana Univ. Purdue Univ. Indianapolis*
11:30 a.m.	ORAL ONLY	**A Study of Surrogate Lithium Ion Cell Fabrication and Characterization for Electrified Vehicles** *OuJung Kwon, Ford Motor Company*

The papers in this session are available in SAE Technical Paper Collection, SUB-TP-00011, and also individually. To purchase visit collections.sae.org

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Advanced Battery Technologies (Part 4 of 6)

Session Code: ***PFL730***

Room 413 B ***Session Time:*** ***1:30 p.m.***

The success of HEV's, PHEV's & EV's is highly dependent on their batteries. This session focuses on advanced battery technologies, including, but not limited to: advanced materials and cell chemistries, battery management systems and controls, modeling, testing, diagnosis and health monitoring, safety, reliability, durability, battery charging, battery economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, module, pack or vehicle levels.

Organizers - *Wayne Cai, General Motors; Yi Ding, RDECOM-TARDEC; James Miller, Argonne National Laboratory; Ramesh Rebba, General Motors LLC*

Time	Paper No.	Title
1:30 p.m.	2017-01-1202	**Functional Safety for Battery Monitoring Integrated Circuits** *Ben Tabatowski-Bush, Ford Motor Company*

2:00 p.m.	***2017-01-1213***	***Design of a Calorimeter for Measurement of Heat Generation Rate of Lithium Ion Battery Using Thermoelectric Device*** *Yilin Yin, Zhong Zheng, Auburn University; Song-Yul Choe, Auburn Univ.*
2:30 p.m.	***2017-01-1199***	***Real Time Application of Battery State of Charge and State of Health Estimation*** *Khalid Khan, Bin Zhou, Michigan Technological University; Amir Rezaei, Bosch*
3:00 p.m.		***BREAK***
3:30 p.m.	***ORAL ONLY***	***Numerical Simulations of Li-ion Batteries With Si Anodes*** *Miao Wang, Xinran Xiao, Michigan State University*
4:00 p.m.	***2017-01-1201***	***Electrochemical Modeling of Lithium Plating of Lithium Ion Battery for Hybrid Application*** *Zhenli Zhang, Johnson Controls; Zhihong Jin, Johnson Controls Power Solutions; Perry Wyatt, Johnson Controls Inc*
4:30 p.m.	***2017-01-1197***	***Exploring the Opportunity Space For High-Power Li-Ion Batteries in Next-Generation 48V Mild Hybrid Electric Vehicles*** *Aziz Abdellahi, Saeed Khaleghi Rahimian, Berislav Blizanac, Brian Sisk, A123 Systems Inc.*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Fuel Injection and Sprays (Part 7 of 8)

Session Code: ***PFL320***

Room 414 A ***Session Time:*** ***8:00 a.m.***

This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of both gasoline and diesel fuel sprays and fuel injection equipment are encouraged.

Organizers - *Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Shyam Menon, Louisiana State University; Michele Battistoni, Universita degli Studi di Perugia; Julien Manin, Sandia National Laboratories*

Chairpersons - *Tarek Abdel-Salam, East Carolina University; Robert Campion, Caterpillar Tech Center*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0833***	***Comparison of Direct-Injection Spray Development of E10 Gasoline to a Single and Multi-Component E10 Gasoline Surrogate*** *Meng Tang, Jiongxun Zhang, Xiucheng Zhu, Kyle Yeakle, Henry Schmidt, Seong-Young Lee, Jeffrey Naber, Michigan Technological University; Cody Squibb, FCA US LLC*
8:30 a.m.	***2017-01-0851***	***Experimental Investigation of Fuel Film Characteristics of Ethanol Impinging Spray at Ultra-Low Temperature*** *Hujie Pan, Min Xu, Shanghai Jiao Tong University; David Hung, Huijia Lv, University of Michigan-SJTU Joint Institute; Xue Dong, Shanghai Jiao Tong University; Tang-Wei Kuo, Ronald O. Grover, Scott E. Parrish, General Motors Company*

9:00 a.m.	***2017-01-0847***	***Effect of Lube Oil Film Thickness on Spray/Wall Impingement with Diesel, M20 and E20 Fuels*** *Ming Ge, Xingyu Liang, Hanzhengnan Yu, Yuesen Wang, Hongsheng Zhang, State Key Laboratory of Engines*
9:30 a.m.	***2017-01-0822***	***Validation of a CFD Spray Model Based on Spray Nozzle Characteristics*** *Jim ElkjÃ¦r Bebe, Kasper Steen Andersen, Dinex A/S*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Control System Design & Calibration (Part 3 of 4)

Session Code: ***PFL130***

Room 414 A ***Session Time:*** ***1:30 p.m.***

Separate sub-sessions cover powertrain control, calibration, and system-level optimization processes related to achieving stringent market fuel economy, emissions, performance, reliability, and quality demands. Topics include the control, calibration, and diagnostics of the engine, powertrain, and subsystems related to energy management in conventional and hybrid operation, considering the simultaneous optimization of hardware design parameters and control software calibration parameters.

Organizers - *Xuefei Chen, FCA US LLC; Scott Furry, MathWorks Inc.; Yichao Guo, Ford Motor Co., Ltd.; Kody G. Klindt, IAV Automotive Engineering Inc.; Feilong Liu, Delphi Corp.; Peter J. Maloney, MathWorks; Denise M. Rizzo, US Army TARDEC; Matti Vint, VALEO; Yue-Yun Wang, General Motors LLC*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0604***	***An Efficient Test Methodology for Combustion Engine Testing: Methods for Increasing Measurement Quality and Validity at the Engine Test Bench*** *Christian Friedrich, MAN Diesel & Turbo SE; Yves Compera, Technical University of Munich; Matthias Auer, Gunnar Stiesch, MAN Diesel & Turbo SE; Georg Wachtmeister, Technical University of Munich*
2:00 p.m.	***2017-01-0609***	***A Unified Creep-Speed Control Approach for Automated Parking System*** *Pan Song, Shugang Xie, Yuan Zhong, Bolin Gao, China Automotive Technology and Research Center (CATARC)*
2:30 p.m.	***2017-01-0602***	***Electric Water Cooling Pump Sensitivity Based Adaptive Control*** *Vladimir Vasilije Kokotovic, Colby Buckman, Ford Motor Company*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0594***	***Automated Calibration for Compressor Recirculation Valve Control*** *Baitao Xiao, Erik Hellstrom, Yan Wang, Julia Buckland, Mario Santillo, Ford Motor Company*
4:00 p.m.	***2017-01-0589***	***New Combustion and Powertrain Control Technologies for Fun-to-Drive Dynamic Performance and Better Fuel Economy*** *Shigeru Itabashi, Eiji Murase, Hiroya Tanaka, Masaaki Yamaguchi, Tomokazu Muraguchi, Toyota Motor Corporation*
4:30 p.m.	***2017-01-0596***	***Injection Pattern Design for Real Time Control of Diesel Engine Acoustic Emission*** *Vittorio Ravaglioli, University of Bologna; Federico Stola, Matteo De Cesare, Magneti Marelli SPA - Powertrain; Fabrizio Ponti, University of Bologna; Stefano Sgatti, Magneti Marelli SPA - Powertrain*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00577, and also individually. T purchase visit collections.sae.org

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Wednesday, April 5

LCA and Automotive Sustainability: Materials Production; Manufacturing; Use; End-of-Life (Part 1 of 2)

Session Code: ***SDP102***

Room 414 B ***Session Time:*** ***1:30 p.m.***

This session covers topics on life cycle assessment and automotive sustainability with respect to materials tools/technologies and/or processes in any phase of the automotive life cycleâ€"materials production, manufacturing, Use, and End-of-Life.

Organizers - *Susan Sawyer-Beaulieu, Katie Soulliere, Univ. of Windsor*

Time	Paper No.	Title
1:30 p.m.	***2017-01-1274***	***Impact of Powertrain Type on Potential Life Cycle Greenhouse Gas Emission Reductions from a Real World Lightweight Glider*** *Jason M. Luk, University of Toronto; Hyung Chul Kim, Robert De Kleine, Timothy J. Wallington, Ford Motor Company; Heather L. MacLean, University of Toronto*
2:00 p.m.	***2017-01-1278***	***Development of Chemical Process for Recovering High-quality Rare-earth Oxides from HV Motor Magnets*** *Keisuke Isomura, Toyota Motor Corporation*
2:30 p.m.	***2017-01-1277***	***Testing of Commercial Electric Vehicle Battery Modules for Circular Economy Applications*** *Jakobus Groenewald, Thomas Grandjean, WMG Innovative Solutions; James Marco, Widanalage Widanage, Warwick University*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-1276***	***Shared Autonomous Vehicles as a Sustainable Solution to the Last Mile Problem: A Case Study of Ann Arbor-Detroit Area*** *Aditi Moorthy, Univ of Michigan - Ann Arbor; Robert De Kleine, Ford Motor Company; Gregory Keoleian, Jeremy Good, Geoff Lewis, Univ of Michigan - Ann Arbor*
4:00 p.m.	***2017-01-1273***	***Life Cycle Analysis of 1995-2014 U.S. Light-Duty Vehicle Fleet: The Environmental Implications of Vehicle Material Composition Changes*** *Qiang Dai, Jarod C. Kelly, Amgad Elgowainy, Argonne National Laboratory*

Planned by Sustainable Development Program Committee / Engineering Meetings Board

Wednesday, April 5

Driveline Lubricants

Session Code: ***PFL360***

Room 415 A ***Session Time:*** ***10:30 a.m.***

In the industry there is continuing work on understanding the interaction of lubricating fluids with driveline hardware and on improving the fluids used in these applications. In this session are presented a variety of papers dealing with different applications where the interaction of driveline fluids with equipment is important.

Organizers - *Jason Bares, BorgWarner Automotive; Timothy P. Newcomb, Lubrizol Corp.; Joe Remias, Afton Chemical Corp.; Choong Fong Tang, BorgWarner Inc.; Tom Hong-Zhi Tang, Idemitsu Lubricants*

America Corp.

Time	Paper No.	Title
10:30 a.m.	***2017-01-0890***	***Development of Next Generation Gear Oil for Heavy Duty Vehicles*** *Yoichiro Nakamura, Masahisa Horikoshi, Yasunori TAKEI, Takahiro Onishi, Hino Motors, Ltd.; Yasuhiro Murakami, Afton Chemical Japan Corp.; Chip Hewette, Afton Chemical Corp.*
11:00 a.m.	***2017-01-0889***	***Development of a Stationary Axle Efficiency Test Stand and Methodology for Identifying Fuel Efficient Gear Oils for Military Applications â€“ Part I*** *Adam Brandt, Southwest Research Institute (SwRI); Allen Comfort, US Army TARDEC; Edwin Frame, Southwest Research Institute (SwRI)*
11:30 a.m.	***2017-01-0891***	***New Perspectives on the Temperature Dependence of Lubricant Additives on Copper Corrosion*** *Gregory Hunt, Lubrizol Ltd.*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Alternative and Advanced Fuels (Part 1 of 2)

Session Code: ***PFL330***

Room 415 A ***Session Time:*** ***1:30 p.m.***

This session includes four papers related to spark-ignition engines and their fuels and five papers related to the processes of compression ignition combustion of different fuels.

Organizers - *Casey Maxwell Allen, Marquette Univ.; Mebougna Drabo, Alabama A & M University; George Karavalakis, University of California - Merced; Paul Richards; Toby Rockstroh, Argonne National Laboratory; Elisa Toulson, Michigan State University*

Time	Paper No.	Title
1:30 p.m.	***2017-01-0872***	***Application of DME 20 Fuel in a Gasoline Passenger Car to Comply with Euro IV Emission Legislation*** *Sunil Kumar Pathak, Vineet sood, Yograj Singh, CSIR- Indian Institute of Petroleum; Shubham Gupta, Indian Institute of Information Tech; Salim Abbasbhai Channiwala, S V National Institute of Technology*
2:00 p.m.	***2017-01-0870***	***Effect of Acetone-Gasoline Blend Ratio on Combustion and Emissions Characteristics in a Spark-Ignition Engine*** *Yuanxu Li, Beijing Jiaotong University; Xiangyu Meng, Dalian University of Technology; Karthik Nithyanandan, University of Illinois; Chia-Fon Lee, University of Illinois; Beijing Institute of Technology; Zhi Ning, Beijing Jiaotong University*
2:30 p.m.	***2017-01-0868***	***Selection Criteria and Screening of Potential Biomass-Derived Streams as Fuel Blendstocks for Advanced Spark-Ignition Engines*** *Robert L. McCormick, Gina Fioroni, Lisa Fouts, Earl Christensen, National Renewable Energy Laboratory; Janet Yanowitz, Ecoengineering Inc.; Evgueni Polikarpov, Karl Albrecht, Daniel J. Gaspar, Pacific Northwest National Laboratory; John Gladden, Anthe George, Sandia National Laboratory*
3:00 p.m.		***BREAK***

3:30 p.m.	***2017-01-0874***	***Experimental Investigations on CI and SI Combustion Mode with Naphtha Fuels for Stationary Engine Applications*** *Thorsten Langhorst, Felix Rosenthal, Thomas Koch, KIT Karlsruhe Institute of Technology*
4:00 p.m.	***2017-01-0863***	***Laminar Burning Velocity Measurements in DIPK-An Advanced Biofuel*** *Bader Almansour, Sami Alawadhi, University of Central Florida; Subith Vasu, University Of Central Florida*
4:30 p.m.	***2017-01-0865***	***Impact of the Direct Injection of Liquid Propane on the Efficiency of a Light-Duty, Spark-Ignited Engine*** *Mark Walls, Michael Joo, Michael Ross, Southwest Research Institute*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Fuel and Additive Effects on Engine Systems (Part 3 of 3)

Session Code: ***PFL310***

Room 415 B ***Session Time:*** ***8:00 a.m.***

Topics include the effects of fuel and additives on deposit formation, intake system cleanliness, friction, wear, corrosion, and elastomer compatibility. Also covered are effects of fuel specification on drivability, on evaporative emissions, and on the relationship between emissions and drive cycle.

Organizers - *Julie Galante-Fox, Afton Chemical Corp.; Barbara Goodrich, John Deere Product Engineering Center; Paul Richards; Phoi Truong, PACCAR Inc.*

Chairpersons - *Julie Galante-Fox, Afton Chemical Corp*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0799***	***Impact of Fuel Sensitivity (RON-MON) on Engine Efficiency*** *Arjun Prakash, Chongming Wang, Andreas Janssen, Allen Aradi, Roger Cracknell, Shell Global Solutions*
8:30 a.m.	***2017-01-0801***	***Gasoline Anti-Knock Index Effects on Vehicle Net Power at High Altitude*** *Keith Vertin, Brent Schuchmann, SGS North America, Inc.; William Studzinski, Richard S. Davis, General Motors; Thomas G. Leone, James E. Anderson, Ford Motor Company; Asim Iqbal, Fiat Chrysler Automobiles*
9:00 a.m.	***2017-01-0810***	***Octane Requirement and Efficiency in a Fleet of Modern Vehicles*** *Jan-Hendrik Redmann, Maik Beutler, Shell Global Solutions GmbH; Jennifer Kensler, Shell Global Solutions Inc.; Martin Luebbers, Luebbers Automotive Testing Consultancy; Roger Cracknell, Shell Global Solutions*
9:30 a.m.	***2017-01-0811***	***Effect of Octane Number on the Performance of Euro 5 and Euro 6 Gasoline Passenger Cars*** *John Williams, BP International Ltd.; Heather D. Hamje, David J. Rickeard, Concawe; Andreas Kolbeck, Shell Global Solutions; Kalle Lehto, Neste; Elena Rebesco, ENI SPA; Walter Mirabella, Lyondell Basell; Carole A. Bontoft, ExxonMobil Research and Engineering Co.; Maria Dolores Cardenas, REPSOL SA*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

CI & SI Power Cylinder Systems (Part 1 of 2)

Session Code: ***PFL530*** ***1:30 p.m.***

Room 415 B ***Session Time:***

This session covers the Power Cylinder: piston, piston rings, piston pins, and connecting rods. The papers include information on reducing friction and increasing fuel economy, improving durability by understanding wear, and decreasing oil consumption and blow-by.

Organizers - *Dan Richardson, Yong-Ching Chen, Cummins Inc.; Leonid Tartakovsky, Technion Israel Inst. of Technology*

Chairpersons - *Dave McNulty, Cummins Inc.; Dan Richardson, Cummins*

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	**Behavior of Lubricating Oil in a Two-Stroke Gasoline Engine** *Kohei Nakashima, Yoshio Murakami, Meijo Univ.*
2:00 p.m.	2017-01-1044	**Piston Friction Reduction by Reducting Piston Compression Height for Large Bore Engine Applications** *Chao Cheng, Akintomide Akinola, Cummins Inc.*
2:30 p.m.	2017-01-1043	**Development and Application of Ring-Pack Model Integrating Global and Local Processes. Part 1: Gas Pressure and Dynamic Behavior of Piston Ring Pack** *Yang Liu, Massachusettes Institute of Technology; Tian Tian, Massachusetts Institute of Technology*
3:00 p.m.		**BREAK**
3:30 p.m.	2017-01-1047	**Development and Application of Ring-Pack Model Integrating Global and Local Processes. Part 2: Ring-Liner Lubrication** *Yang Liu, Massachusettes Institute of Technology; Yuwei Li, Tian Tian, Massachusetts Institute of Technology*
4:00 p.m.	2017-01-1045	**Influence of Oil Drain Holes on Oil Emission of a Turbocharged Gasoline Engine** *Ioannis Papadopoulos, Simon Becker, Holger Ehnis, Reiner Kunzel, MAHLE International GmbH; Armin Frommer, MAHLE Industries, Incorporated*

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Technological Developments in China (Part 1 of 2)

Session Code: ***PFL180***

Room 420 A ***Session Time:*** ***8:00 a.m.***

Technical presentation, review and investigation focusing on China market, including powertrain technology roadmap, regulation review, product development and localization, off road applications, new technology evaluation etc, covering both conventional and alternative powertrain and other vehicular component and system aspects.

Organizers - *Liu Chuanli, General Motors LLC; Liangjun Hu, Ford Motor Company; Shan Jia, Federal-Mogul Corp.; Dongxu Li, General Motors LLC; Jim Li, GM; Feilong Liu, General Motors LLC; Qilong Lu, Southwest Research Institute; Shouxian Ren, General Motors*

Time	Paper No.	Title

8:00 a.m.	***ORAL ONLY***	***Challenges in Meeting China 6 Regulations*** *The sixth stage of light-duty vehicle emission standard was promulgated by the Ministry of Environmental Protection of China on 23 Dec, 2016. The new emission standard contains two stages, namely China-6a and China-6b, and will be effective from Jul, 2020 and Jul, 2023 respectively. This presentation addresses the background of China-6, basic principles for drafting China-6 and the dominant differences between China-6 and its ancestors. This presentation also highlights the new challenges associated with the introduction of WLTC as test cycle, new requirements for low-temperature test and evaporative and refilling emissions, changes in OBD regulation, and particularly RDE test.* *Yunshan Ge, Beijing Institute of Technology*
8:30 a.m.	***ORAL ONLY***	***Discussion on Combustion Technology to Improve Thermal Efficiency for Heavy-Duty Diesel Engines with Ultra-Low NOx Emissions*** *Mingfa Yao, Tianjin Univ.*
9:00 a.m.	***ORAL ONLY***	***Dynamic Skip Fire: Application to a 4-cylinder Turbocharged GDi vehicle*** *Global fuel economy and CO2 mandates require a substantial increase in vehicle fuel efficiency over the next several years. Vehicle electrification will clearly play an increasing role, as will efforts to reduce vehicle mass, friction, aerodynamic drag, and rolling resistance. However, efficiency improvements to the internal combustion engine must continue, since it will be the dominant automotive propulsion source for many years to come. New technologies will continue to be developed as the internal combustion engine evolves. To be successful, these technologies cannot focus exclusively on efficiency and emissions. They must also maintain fun-to-drive performance and deliver their benefits at an affordable cost. Cylinder deactivation systems are one technology that allows internal combustion engines to function more efficiently without sacrificing performance. Cylinder deactivation is a proven approach for high cylinder count (e.g., V8) engines, but implementing the traditional method of deactivating a fixed set of cylinders is a real challenge for 4-cylinder engines due to noise and vibration refinement issues. Delphi and Tula Technology are executing a joint project to demonstrate Dynamic Skip Fire (DSF) in a 4-cylinder turbocharged gasoline direct injection (T-GDi) vehicle. DSF is an advanced cylinder deactivation strategy providing independent control for each cylinder that can provide up to 10% or greater fuel economy benefit, depending on the application. Engine firing decisions are made independently on a cylinder-by-cylinder and cycle-by-cycle basis to manage engine torque while firing a minimum number of cylinders. This results in a dramatic reduction in engine pumping losses and improved thermodynamic efficiency compared to standard, throttled engine operation. A key attribute of DSF is proprietary algorithms that manage the frequency of fired and skipped cylinders to maintain excellent NVH characteristics. The presentation will provide an overview of technology, describe its value proposition, summarize vehicle development activities including system content, hardware modifications and controls approach and provide initial results for the target application.* *Keith A. Confer, John Kirwan, William Fedor, Delphi Automotive; Steven Carlson, Jerry Frank Fuschetto, Matthew Younkins, Tula Technology Inc.*
9:30 a.m.	***ORAL ONLY***	***Geely Strategy to face the challenge of China6 emission*** *Shuangqing Li, Geely Powertrain Research Institute; Sufen Jia, Lin Yang, Geely Automobile Holdings, Ltd.*
10:00 a.m.		***BREAK***
10:30 a.m.	***ORAL ONLY***	***CAE guided turbo-charging DI engine development*** *Huixian Shen, ChangAn Auto Group*

11:00 a.m.	***ORAL ONLY***	***CONVERGE CFD for rapid and accurate modeling of IC Engine flow, spray and combustion*** *Daniel Lee, Convergent Science Inc.*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Technological Developments in China (Part 2 of 2)

Session Code: ***PFL180***

Room 420 A ***Session Time:*** ***1:30 p.m.***

Technical presentation, review and investigation focusing on China market, including powertrain technology roadmap, regulation review, product development and localization, off road applications, new technology evaluation etc, covering both conventional and alternative powertrain and other vehicular component and system aspects.

Organizers - *Liu Chuanli, General Motors LLC; Liangjun Hu, Ford Motor Company; Shan Jia, Federal-Mogul Corp.; Dongxu Li, General Motors LLC; Jim Li, GM; Feilong Liu, Delphi Corp.; Qilong Lu, Southwest Research Institute; Shouxian Ren, General Motors*

Time	***Paper No.***	***Title***
1:30 p.m.	***ORAL ONLY***	***New vision - China transmission market prospect*** *Fangqing Huang, IHS, APAC*
2:00 p.m.	***ORAL ONLY***	***Optimized Electric Powertrain by Combining Electric Motor and Transmission Core Technologies*** *Ping Yu*
2:30 p.m.	***2017-01-0651***	***Evaluation of a Commercial Demonstration Bus Line Utilizing Wireless Charging Technology*** *Yaodong Hu, Siyuan Feng, Changsheng Yao, Wenbo Shao, Lubing Xu, Xieyuan Zhang, Li Lin, Jinyu Zhang, Fuyuan Yang, Tsinghua University; Rusheng Yan, ZTE Corporation*
3:00 p.m.		***BREAK***
3:30 p.m.	***ORAL ONLY***	***Meeting emissions targets through integrated CAE: downsizing, electrification, catalyst and on-board control*** *Meeting increasingly stringent emissions standards and, the tradeoff between emissions and efficiency necessitate research of new technologies and innovation. According to DOE, on-road vehicles account for 60% of the fossil fuel consumption and 25% of the greenhouse gas emissions in USA. All the leading indicators project that these shares will go up mostly due to the additional vehicles on the road even when significant gains will undoubtedly be made in fuel economy through the use of innovative technologies.* *Syed Ah Wahiduzzaman*
4:00 p.m.	***ORAL ONLY***	***Model-based engine combustion control*** *Guoming G. Zhu, Michigan State University*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Meeting the ARB Low Emission Standard

Session Code: ***PFL426***

Room 420 B ***Session Time: 8:00 a.m.***

To achieve the national Ambient Air Quality Standards (NAAQS) targets for ozone and particulate matter, even more stringent tailpipe NOx emissions limits may be required. This session focuses on advanced technologies being developed to achieve ultra-low NOx emissions (well below the current 0.2g/hp-hr standard) as well as their tradeoffs. Also discussed are approaches towards meeting the 2017 greenhouse gas standards.

Organizers - *Brad Adelman, Navistar Inc.; Cary Henry, Southwest Research Institute; Krishna Kamasamudram, Ashok Kumar, Cummins Inc.*

Time	Paper No.	Title
8:00 a.m.	***ORAL ONLY***	***Achieving Ultra Low NOX Emission Levels with A 2017 Heavy Duty Diesel Engine â€“ An Examination of the SAE Manuscripts 17PFL-0345, 0346 and 0347*** *Christopher Sharp, Southwest Research Institute; Cynthia C. Webb, Low Emission Technology Solutions; Seungju Yoon, Michael Carter, ARB; Cary Henry, Gary D. Neely, Bryan Zavala, Jayant V. Sarlashkar, Sankar B. Rengarajan, Southwest Research Institute*
9:00 a.m.	***ORAL ONLY***	***Sustained Low-Temperature NOx Reduction for High-Efficiency Diesel Engines*** *Yuhui Zha, Cummins Inc.; Michael cunningham, Venkata Lakkireddy, Ashok kumar, Aleksey Yezerets, Cummins Inc; Zhehao Wei, Johnson Matthey Inc; Feng Gao, Pacific Northwest National Laboratory; Howard Hess, Johnson Matthey Inc; Balaji Sukumar, Johnson Matthey ECT; John Heichelbech, Cummins Inc; Joseph Fedeyko, Johnson Matthey ECT; Janos Szanyi, PNNL; Anand Srinivasan, Cummins Inc*
9:30 a.m.	***2017-01-0955***	***Durability Assessment of Diesel Cold Start Concept (dCSCâ,¢) Technologies*** *Hai-Ying Chen, Donna Liu, Erich Weigert, Lasitha Cumaranatunge, Kenneth Camm, Patrick Bannon, Julian Cox, Louise Arnold, Johnson Matthey Inc.*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0953***	***The Impact of Ammonium Nitrate Species on Low Temperature NOx Conversion Over Cu/CHA SCR Catalyst*** *Jinyong Luo, Yadan Tang, Saurabh Joshi, Krishna Kamasamudram, Neal Currier, Aleksey Yezerets, Cummins Inc.*
11:00 a.m.	***2017-01-0957***	***Achieving 0.02 g/bhp-hr NO_x Emissions from a Heavy-Duty Stoichiometric Natural Gas Engine Equipped with Three-Way Catalyst*** *Ian Smith, Thomas Briggs, Christopher Sharp, Southwest Research Institute; Cynthia Webb*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Advances in NOx Reduction Technology (Part 1 of 2)

Session Code: ***PFL424***

Room 420 B ***Session Time: 1:30 p.m.***

These sessions will focus on â€˜Advances in NOx Reduction Technologyâ€™. The topics covered will include: new materials for Lean NOx Traps (LNT) and Selective Catalytic Reduction (SCR); system integration and durability; advances in NOx catalyst substrates, novel reductants and mixing designs.

Organizers - *Brad Adelman, Navistar Inc.; Danan Dou, John Deere Product Engineering Center; Magdi K. Khair, Magdiesel Technologies; Rahul Mital, General Motors LLC; Shyam Santhanam, Navistar Inc.*

Time	Paper No.	Title

1:30 p.m.	***2017-01-0944***	***Detailed Mechanism of S Poisoning and De-Sulfation Treatment of Cu-SCR Catalyst*** *Ryuji Ando, Takashi Hihara, Yasuyuki Banno, Makoto Nagata, N.E. Chemcat Corp.; Tomoaki Ishitsuka, Nobuyuki Matsubayashi, Advanced Industrial Science & Technology; Toshihisa Tomie, Changchun University of Science and Technology (CUST)*
2:00 p.m.	***2017-01-0938***	***Robust, Model-Based Urea Dosing Control for SCR Aftertreatment Systems using a Cross-Sensitive Tailpipe NOx Sensor*** *Gillis Hommen, Frank Kupper, Xander Seykens, TNO Automotive*
2:30 p.m.	***2017-01-0936***	***Cascade MPC Approach to Automotive SCR Multi-brick Systems*** *Pavel Krejza, Jaroslav Pekar, Jiri Figura, Lukas Lansky, Honeywell Automotive Software; Dirk von Wissel, Tianran Zhang, Renault SA*
3:00 p.m.		***BREAK***
3:30 p.m.	***2017-01-0937***	***Development of Robust Electric Heating System for Medium Duty Diesel Vehicles*** *David Culbertson, James Pradun, Watlow; Magdi Khair, Magdiesel Technologies; Jeff Diestelmeier, Watlow*
4:00 p.m.	***2017-01-0943***	***Selective Catalytic Reduction Control with Multiple Injectors*** *Cory S. Hendrickson, Devesh Upadhyay, Michiel Van Nieuwstadt, Ford Motor Company*
4:30 p.m.	***2017-01-0945***	***Radio-Frequency-Based Urea Dosing Control for Diesel Engines with Ammonia SCR Catalysts*** *Markus Dietrich, Carsten Steiner, Gunter Hagen, Ralf Moos, University of Bayreuth*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Emissions Measurement and Testing (Part 3 of 3)

Session Code: ***PFL440***

Room 430 B ***Session Time:*** ***8:00 a.m.***

Sub-sessions cover emissions measuring techniques and testing regimes. This includes new analysis techniques and the novel application of existing techniques, the comparison of existing and proposed testing regimes with real world experience, including modeling.

Organizers - *Mike Braisher, Jaguar Land Rover; Praveen Chavannavar, General Motors LLC; Scott Allen Drennan; Allen B. Duncan, US EPA; Leslie Hill, Horiba Automotive Test Systems Corp.; Mahmoud K. Yassine, FCA US LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0991***	***Refinement of the Legislative Test Cell Conditions Based on Local Real World Ambient Condition*** *Sunil Kumar Pathak, Yograj Singh, Vineet sood, CSIR- Indian Institute of Petroleum; Salim Abbasbhai Channiwala, S V National Institute of Technology*
8:30 a.m.	***2017-01-0985***	***Real-World Emissions Measurements of a Gasoline Direct Injection Vehicle without and with a Gasoline Particulate Filter*** *Joachim Demuynck, Cecile Favre, Dirk Bosteels, AECC; Heather Hamje, Concawe; Jon Andersson, Ricardo Consulting Engineers Ltd.*

9:00 a.m.	***2017-01-0987***	***Understanding System- and Component-Level N₂O Emissions from a Vanadium-Based Nonroad Diesel Aftertreatment System*** *Nathan Ottinger, Niklas Schmidt, Z. Gerald Liu, Cummins Emission Solutions*
9:30 a.m.	***2017-01-0988***	***Axial NO₂ Utilization Measurements within a Partial Flow Filter during Passive Regeneration*** *Michael Cunningham, Cummins Inc.; Mi-Young Kim, Oak Ridge National Laboratory; Venkata Lakkireddy, Cummins Inc.; William Partridge, Oak Ridge National Laboratory*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0998***	***Analysis of the Effect of Oxygen Concentration on the Thermal Aging of Automotive Catalysts*** *Kurtis James Irwin, Queen's University of Belfast; Jonathan Stewart, Catagen Limited; Roy Douglas, Queen's University of Belfast; Andrew Woods, Catagen Limited; Richard Oâ€™Shaughnessy, Queen's University of Belfast; Andrew Pedlow, Rose Mary Stalker, Catagen Limited*
11:00 a.m.	***2017-01-0999***	***Development of a Lab Reactor System for the Evaluation of Aftertreatment Catalysts for Stoichiometric Natural Gas Engines*** *Yuanzhou Xi, Nathan Ottinger, Z. Gerald Liu, Cummins Emission Solutions*
11:30 a.m.	***2017-01-0986***	***Evaluation Between Engine Stop/Start and Cylinder Deactivation Technologies Under Southeast Asia Urban Driving Condition*** *Mohd Azman Abas, Shaiful Fadzil Zainal Abidin, Proton Holdings Berhad; Srithar Rajoo, Universiti Teknologi Malaysia; Ricardo Martinez-Botas, Muhammad Izzal Ismail, Imperial College London*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Wednesday, April 5

Keynote Presentation: China's Automotive Industry Development and Sustainable Innovation

Session Code: ***KEY200***

Room Grand Riverview Ballroom B ***Session Time:*** ***8:00 a.m.***

Time	***Paper No.***	***Title***
	ORAL ONLY	***Learn more about the Speaker*** *In this fascinating keynote, Mr. Yu Kai provides insight on Chinaâ€™s* *Yu Kai, CATARC*

Wednesday, April 5

SAE WCX17 Organic Diversity Panel Lunch: Organic Diversity: How Inclusion Can Help You, Your Team and Company Grow

Session Code: ***WP200***

Room Grand Riverview Ballroom B ***Session Time:*** ***11:30 a.m.***

Inclusion puts the concept and practice of diversity into action by creating an environment of involvement, respect, and connectionâ€"where the richness of ideas, backgrounds, and perspectives are harnessed to create business value. What does this mean for practical purposes? This panel will discuss a variety of perspectives on how individuals, team leaders and businesses can practice inclusion. Understanding and implementing actions for inclusion can help you and your company sustain personal, organizational and top-line growth.
Sponsored by Toyota

Moderators - *Carla Bailo, Ohio State University*

Panelists - *Thomas Apostolos, Magna; Judy Curran, Ford Motor Co., Ltd.; .. TBD; Chelsea White, Toyota Motor Corp.;*

Wednesday, April 5

Technical Expert Panel Discussion: Lightweighting and Environmental Sustainability in the Automotive Interior

Session Code: ***M301***

Room TBD ***Session Time:*** ***10:00 a.m.***

Moderators - *Lisa Fallon, General Motors LLC*

Panelists - *Timothy Boundy, General Motors LLC; Gary D. Mullen, Ford Body Engrg; Joseph Tereau, FCA US LLC; Ravi Thyagarajan, US Army TARDEC;*

Time	Paper No.	Title
9:30 a.m.		BREAK

Wednesday, April 5

Leadership Summit Wednesday

Session Code: ***LS200***

Room The Exchange ***Session Time:*** ***9:15 a.m.***

Time	Paper No.	Title
9:15 a.m.	ORAL ONLY	**Exclusive Interview** *Interview regarding regulation, technology, customer acceptance and disruption in the marketplace. Interviewee: Anthony Foxx, Former Secretary of Transportation Interviewer: Jeff Gilbert, WWJ Newsradio 950* *Meet the Participants*
10:15 a.m.	ORAL ONLY	**Roundtable: Vehicles as a Shared Economy and the Effects of Automated Technology** **Moderators -** *Roger Safford, HNTB Corp.* **Panelists -** *Patrick F. Bassett, DENSO International America Inc.; Dan Curtin, Zipcar Inc.; Robert Grant, Lyft; Peter Kosak, General Motors Company; Sherif Marakby, Uber Technologies Inc.;* *Meet the Panel*
11:30 a.m.	ORAL ONLY	**Roundtable: Technology Jungle and Consumer Acceptance** **Moderators -** *Thomas Mutchler, Consumer Reports* **Panelists -** *Jake Fisher, Consumer Reports; Adrian Lund, Insurance Institute for Highway Safety; Kelly Nantel, National Safety Council; John Nielsen, AAA; Jodi Olshevski, The Hartford;* *Meet the Panel*

Wednesday, April 5

Tech Hub Wednesday Afternoon

Session Code: ***TH200***

Room The Exchange ***Session Time:*** ***1:00 p.m.***

Time	*Paper No.*	*Title*
1:00 p.m.	***ORAL ONLY***	***BMW â€“ The Next 100 Years*** *BMW turned 100 years in 2016. During its history BMW has brought many new technological ideas, innovative designs and new inspiring vehicle models into the markets. As one of the leading automotive OEMâ€™s in innovation BMW keeps engineering and R&D activities at the core of its business introducing new exciting technologies and services in its future models changing the landscape of individual mobility.* *Roberto Rossetti, BMW Group*
1:30 p.m.	***ORAL ONLY***	***The Future Is Now: How a new definition of product has transformed our innovation process.*** *Across the world we are living in congested, sprawling metropolises where challenges of congestion and pollution are inspiring changes in how we choose to live and therefore how we move. We find ourselves in a new era where products are assumed to be a harmonious integration of software, hardware and service and how we product plan for this is new. We imagine new frontiers for the future of mobility and the practice of product planning as we know it.* *Megan Neese, Nissan North America Inc.*
2:00 p.m.		***BREAK***
2:15 p.m.	***ORAL ONLY***	***Artificial Intelligence*** *Artificial intelligence (AI) approaches are making revolutionary impacts on our increasingly data-driven lives, from self-driving cars to natural language processing. Abundance of data, availability of cheap computational power, and algorithmic innovations have allowed AI to reach and surpass human-level intelligence in a variety of fields. In this talk, we will give a high-level overview of several AI approaches such as search, algorithmic game theory, probabilistic reasoning, and machine learning, which are relevant for vehicle modeling and connected autonomous vehicles. We will illustrate the effectiveness of these approaches with two case studies performed at Argonne.* *Prasanna Balaprakash, Argonne National Laboratory*
2:45 p.m.	***ORAL ONLY***	***Cyber Unsafe at Any Speed - the Need for Cybersecurity and Data Privacy Regulation for Motor Vehicles*** *This talk reviews the existing law, policy, cybersecurity and data privacy considerations around conventional, connected, driver-assisted and fully automated vehicles . It contends that* *Simon Hartley, 202 Partners / RunSafe Security*
3:15 p.m.	***ORAL ONLY***	***Future Technology Impact on the Automotive Supply Chain*** *Significant shifts are slated for powertrain, structures, HVAC, braking, suspension and a host of other systemsÂ How quick will shifts occur?Â What drives these?Â Regulations, cost or consumers?* *Michael E. Robinet, IHS Automotive*
3:45 p.m.		***BREAK***

4:00 p.m. ***ORAL ONLY***

Accessible and Versatile Exoskeleton Systems to reduce the risk of injuries and increase productivity

*suitX has developed the most accessible and versatile exoskeleton system essential
ly suitable for all
work settings such as auto assembly plants, distribution centers and construc
tion sites. Max (Modular
Agile eXoskeleton) is an industrial wearable robotic system that minimiz
es workers
â€™
spinal forces, knee
joint forces and shoulder joint forces during the repeating maneuvers on the jo
b. MAX allows its wearer
to complete shoulder, lower back, and leg intensive tasks with reduced injury ri
sk while remaining
comfortable enough to wear all day. MAX is composed of three exoskeleton mod
ules: BACKX,
shoulderX, and legX. shoulderX is an arm exoskeleton that augments its wearer
by
reducing forces at the
shoulder complex, enabling the wearer to perform above the head tasks for
longer d
urations and with
less effort. backX is a novel trunk support exoskeleton that reduces the forc
es and torques on a wearer
â€™
s lower back region (L5/S1 disc) by an average of 60% while stooping, lift
ing objects, bending or
reaching. legX is a leg exoskeleton that allows the wearer to squat repeatedly o
r for prolonged periods
of time by reducing the forces on the knee joint and the quadricep muscles.
Each module can be worn
independently and in any combination depending on need. All modul
es intelligently engage when you
need them, and don
â€™
t impede you otherwise. Ascending and descending stairs and ladders, driving
, and
biking are completely unimpeded.
The countless field evaluations in construction locations, material
handling, shipbuilding facilities,
foundries, factories, distribution centers, warehouses and airport baggage handlin
g led to these
effective and comfortable exoskeleton. MAX won two Saint Gobain Nova Inn
ovation Awards for its
intelligent design, effectiveness, affordability, outstanding ergonomic featu
res and ease of use.*

Homayoon Kazerooni, University of California Berkeley

4:30 p.m.	***ORAL ONLY***	***Data is the new oil: Big Data in Automotive Mobility***

As autonomous cars prepare to hit the roads, a tidal wave of data will come with them. Today, the average person generates around 650 megabits of data per day. By 2020, an autonomous vehicle will produce approximately 4 terabytes of data per day. Autonomous vehicles will need to navigate new environments, continuously update high-precision maps, anticipate what other cars around them will do and learn from the collective knowledge of other autonomous vehicles, which will be stored in the cloud. New technologies, like 5G, will enable data to move back and forth between cars, the cloud, and all the â€œthingsâ€ around them seamlessly. Big data in automotive is a BIG challenge, and Kathy will explore what this means for the automotive industry â€“ and specifically autonomous driving - and how Intel is partnering with the ecosystem to solve these problems.

Kathy Winter, Intel

Wednesday, April 5

Knowledge Bar - Wednesday

Session Code: ***KB200***

Room The Knowledge Bar ***Session Time:*** ***2:00 p.m.***

Time	***Paper No.***	***Title***
3:00 p.m.	***ORAL ONLY***	***Digital Imaging Devices for Accident Reconstruction***
		Toby Terpstra, Kineticorp LLC
3:30 p.m.	***ORAL ONLY***	***Stop Start Architecture***
		Andrew Brocker, General Motors; Eugene F. Saltzberg, General Motors LLC
4:00 p.m.	***ORAL ONLY***	***SAE Test Procedure Standards for Efficiency and Peak Power Dynamometer Testing of xEVs***
		Michael Duoba, Argonne National Laboratory
4:30 p.m.	***ORAL ONLY***	***Simulation and Testing for ADAS and Autonomous Vehicles***
		Jace Allen, dSPACE Inc.
5:00 p.m.	***ORAL ONLY***	***Autonomous Mobility Architecture, Design, and Testing for Large Tactical Vehicles***
		Alex Kade, TARDEC

Wednesday, April 5

Learning Lab - Wednesday

Session Code: ***LL200***

Room The Learning Lab ***Session Time:*** ***ALL DAY***

Time	***Paper No.***	***Title***

10:00 a.m.	***ORAL ONLY***	***Product Integrity for Connected and Automated Vehicles*** *As automated and connected features are introduced into vehicles, the electronic systems delivering those features are increasing in scale, complexity and diversity. This talk will explore the challenges around functional performance, functional safety and cybersecurity presented by increasing autonomy and connectivity. We will also highlight appropriate engineering approaches to assure the integrity and resilience of electronic systems within vehicles.* *Paul Wooderson, Horiba Mira, Ltd.*
10:30 a.m.	***ORAL ONLY***	***Laboratory Management Systems - Automation Beyond the Test Cell*** *Jorg Siebler, Horiba, Ltd.*
11:00 a.m.	***ORAL ONLY***	***Efficient Composites with New Off-Tool 3D Foam*** *Reid Averill, Evonik Foams Inc; Axel Zajonz, Evonik Corporation*
11:30 a.m.	***ORAL ONLY***	***Inside Honda's Award-Winning Light Truck Platform*** *Robb L. Augustine, Honda R & D Americas Inc.*
12:00 p.m.	***ORAL ONLY***	***Climate Control Impact to Battery Range*** *Robert J. Brinker, DENSO International America Inc.*
12:30 p.m.	***ORAL ONLY***	***QUANTUMâ„¢ Lightweight Axle Technology â€“ A Disruptor*** *John C. Hibbler, AAM (American Axle & Mfg Inc)*
1:30 p.m.	***ORAL ONLY***	***AutoDrive Challengeâ„¢ Announcement*** *Kenneth Kelzer, General Motors LLC*
2:30 p.m.	***ORAL ONLY***	***MDrive Car Sharing Project*** *Michael Douglas Bima, DENSO International America Inc.*
3:00 p.m.	***ORAL ONLY***	***ACRYLITEÂ® Resist AG 100: PMMA Molding Compound for Automotive Glazing*** *Lawrence N. Gabriel, Evonik Cyro LLC*
3:30 p.m.	***ORAL ONLY***	***Balancing the Future Between Conventional Engine and Electrification Technologies*** *Tony Ockelford, Ford Motor Company*
4:30 p.m.	***ORAL ONLY***	***Lessoned Learned from A Solar Car*** *Michael Katz, University of Michigan Solar Car*

Thursday, April 6

Active Safety: Systems and Sub Systems (Part 1 of 2)

Session Code: ***SS400***

Room 140 C ***Session Time:*** ***8:00 a.m.***

This session will focus on how Active Safety and Driver assistance systems are gaining importance and yielded significant safety benefits that are possible from the deployment of those systems in the fleet. It will address deployment strategies and technologies used by the industry and the government as well as consumer acceptance and market demand for these systems. Lastly, discussion on information gained from the various onboard sensors and vision systems in active safety systems will occur.

Organizers - *H. Clay Gabler, Virginia Tech.; Tom Hollowell, WTH Consulting, LLC; Rini Sherony, Toyota Motor Corp.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1407***	***Lane-Keeping Behavior and Cognitive Load with Use of Lane Departure Warning*** *Helene G. Moorman, Andrea Niles, Caroline Crump, Exponent Inc.; Audra Krake, California State University Long Beach; Benjamin Lester, Laurene Milan, Christy Cloninger, David Cades, Douglas Young, Exponent Inc.*

8:30 a.m.	***ORAL ONLY***	***Investigating the Earliest Detection Opportunity for Intersection Driver Assistance Systems Aimed at Preventing Left Turn Across Path Opposite Direction Crashes*** *John M. Scanlon, Kevin Ota, Virginia Tech; Rini Sherony, Toyota Motor Corp; H. Clay Gabler, Virginia Tech*
9:00 a.m.	***2017-01-1408***	***Development of Automatic Braking System to Help Reduce Rear Impacts*** *Satoshi Kozai, Yoshihiko Takahashi, Akihiro Kida, Toyota Motor Corporation; Takayuki Hiromitsu, Shinji Kitaura, DENSO Corporation; Sadamasa Sawada, Gladys Acervo, Continental Automotive Corporation; Marius Ichim, Continental Automotive Systems*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1402***	***Analysis of Human Driver Behavior in Highway Cut-in Scenarios*** *SeHwan Kim, Junmin Wang, Dennis Guenther, Gary Heydinger, The Ohio State University; Joshua Every, M. Kamel Salaani, Transportation Research Center Inc; Frank Barickman, National Highway Traffic Safety Administration*
10:30 a.m.	***2017-01-1399***	***Analysis of Steering Model for Emergency Lane Change Based on the China Naturalistic Driving Data*** *Bin Wu, Tongji University/SMVIC; Xichan Zhu, Tongji University; Jianping Shen, Xuejun Cang, SMVIC; Lin li, Tongji University*
11:00 a.m.	***2017-01-1400***	***Vehicle-GIS Assistant Driving System for Real-time Safety Speed Warning on Mountain Roads*** *Keyu Qian, Wuhan University of Technology; Gangfeng Tan, Wuhan Univ. of Tech / Virginia Tech; Renjie Zhou, Binyu Mei, Wanyang XIA, Wuhan University of Technology*

Planned by Automobile Body, Chassis, Safety, and Structures Activity / EMB Land and Sea Group; Automobile Elect Activity / EMB Land and Sea Group

Thursday, April 6

Active Safety: Systems and Sub Systems (Part 2 of 2)

Session Code: ***SS400***

Room 140 C ***Session Time:*** ***1:00 p.m.***

This session will focus on how Active Safety and Driver assistance systems are gaining importance and yielded significant safety benefits that are possible from the deployment of those systems in the fleet. It will address deployment strategies and technologies used by the industry and the government as well as consumer acceptance and market demand for these systems. Lastly, discussion on information gained from the various onboard sensors and vision systems in active safety systems will occur.

Organizers - *H. Clay Gabler, Virginia Tech.; Tom Hollowell, WTH Consulting, LLC; Rini Sherony, Toyota Motor Corp.*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1403***	***Bridging the Gap between Open Loop Tests and Statistical Validation for Highly Automated Driving*** *Alexander Koenig, Michael Gutbrod, BMW AG; SÃ¶ren Hohmann, Julian Ludwig, KIT Karlsruhe Institute of Technology*
1:30 p.m.	***2017-01-1409***	***Technology from Highly Automated Driving to Improve Active Pedestrian Protection Systems*** *Markus Schratter, Virtual Vehicle Research Center; Susie Cantu, Thomas Schaller, BMW Group; Peter Wimmer, Daniel Watzenig, Virtual Vehicle Research Center*

2:00 p.m.	***2017-01-1406***	***The Robustly-Safe Automated Driving System for Enhanced Active Safety*** *Changliu Liu, Jianyu Chen, University of California, Berkeley; Trong-Duy Nguyen, DENSO International America, Inc.; Masayoshi Tomizuka, University of California, Berkeley*
2:30 p.m.	***2017-01-1398***	***Feasibility Study of Drowsy Driving Prediction based on Eye Opening Time*** *Yoshiyuki Hatakeyema, Toyota Motor Corporation*
3:00 p.m.	***2017-01-1401***	***Improved Perception for Automated Vehicle Using Multi-Pose Camera System*** *Trong-Duy Nguyen, Joseph Lull, Satish Vaishnav, DENSO International America Inc.*

Planned by Automobile Body, Chassis, Safety, and Structures Activity / EMB Land and Sea Group; Automobile Elect Activity / EMB Land and Sea Group

Thursday, April 6

Fire Safety

Session Code: ***SS200***

Room 140 D ***Session Time:*** ***8:00 a.m.***

The fire safety session will focus on current developments in the fields of vehicle fire science, statistics, risks, assessment and mitigation. Papers addressing vehicle design, live-fire tests and fire investigation issues applicable to traditional, electric and alternatively fueled vehicles will be presented.

Organizers - *Mark William Arndt, Transportation Safety Tech. Inc.; James J. Engle, Ford Motor Company; Steven Hodges, Alion Science & Technology; Jeffrey Santrock, General Motors LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1351***	***Fire Suppression Modeling & Simulation Framework for Ground Vehicles*** *Vamshi Korivi, Steven McCormick, US Army TARDEC; Steven Hodges, Alion Science & Technology*
8:30 a.m.	***2017-01-1352***	***Vapour Space Flammability Measurements of High Ethanol (â€œE85â€) and Low Ethanol (â€œE10â€) Winter Automotive Fuels: Effects of Fuel Composition and Vapour Pressure*** *David Gardiner, Nexum Engine R&D*
9:00 a.m.	***2017-01-1353***	***Effects of Wind Speed and Longitudinal Direction on Fire Patterns from a Vehicle Fire in a Compact Car*** *Michael G. Leffert, General Motors Co.*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1355***	***Full Scale Burn Test of Four Aluminum Body Ford F-150â€™s*** *Paul H. DeMarois, Bill Pappas, William G. Ballard, Jeffrey R. Williams, Gregory West, Ford Motor Company*
10:30 a.m.	***2017-01-1350***	***Fuel Filler System Check Valves - Dynamic Evaluation*** *Jon Olson, Superior Forensic Engineering; Mark Fleming, Caulfield Engineering; Ram Krishnaswami, Robert Pellillo, Ford Motor Company*
11:00 a.m.	***2017-01-1354***	***Vehicle Fires Resulting from Hot Surface Ignition of Grass and Leaves*** *Timothy Morse, Michael Cundy, Harri Kytomaa, Exponent, Inc.*

Planned by Fire Safety Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 6

Occupant Protection: Occupant Restraints (Air Bags, Seat Belts, Knee Bolsters, Child Seats, etc.)

Session Code: ***SS504***

Room 140 E ***Session Time:*** ***8:00 a.m.***

The Occupant Restraints Session invites papers that document new research on the restraint topics of airbags, seat belts, inflatable bolsters/seat belts, knee bolsters, Child Restraint Systems (CRS) and other related areas. These papers could include several of the following: technology description, occupant performance considerations, field data studies, development/validation methodology / results, CAE/Finite Element methods/results, packaging, and implementation / performance challenges.

Organizers - *Aditya Belwadi, Children's Hospital of Philadelphia; Srinivasan Sundararajan, Ford Motor Co., Ltd.; Scott D. Thomas, General Motors; Chris A. Van Ee, Design Research Engineering*

Time	Paper No.	Title
8:00 a.m.	2017-01-1448	***A Test Method to Assess Interactions and Compatibility of Inflatable Seatbelts with Child Restraint Systems*** *Kevin Pline, Derek Board, Nirmal Muralidharan, Srinivasan Sundararajan, Eric Eiswerth, Katie Salciccioli, Ford Motor Company*
8:30 a.m.	2017-01-1445	***An Assessment of Inflatable Seatbelt Interaction and Compatibility with Rear-Facing-Only Child Restraint Systems*** *Kevin Pline, Derek Board, Nirmal Muralidharan, Srinivasan Sundararajan, Eric Eiswerth, Katie Salciccioli, Noelle Baker, Ford Motor Company*
9:00 a.m.	2017-01-1446	***A Self-Adapting Passenger Airbag for the USNCAP*** *Allen Charles Bosio, Paul Marable, Marcus Ward, Bradley Staines, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	~~2017-01-1447~~ ***ORAL ONLY***	***Innovative Knee Airbag Design to Address ATD Knee-Thigh-Hip Response in the Small Overlap Rigid Barrier (SORB) Crash Test*** *Pardeep K. Jindal, Ford Motor Company; Rahul Makwana, Detroit Engineered Products (DEP) Inc; Djamal Midoun, Edward Abramoski, Matthew Makowski, Ford Motor Company; Ravi Kodwani, Altair Engineering*

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 6

Occupant Protection: Pedestrian and Cyclist Safety

Session Code: ***SS505***

Room 140 F ***Session Time:*** ***8:00 a.m.***

The pedestrian and cyclist safety session focuses on research and development efforts aimed at protecting pedestrians and cyclists in the event of vehicle impact. Papers on injury biomechanics, vehicle design, dummy and impactor development, computational modeling, regulations and consumer assessment testing, active safety and collision avoidance are accepted for this session.

Organizers - *Carlos Arregui Dalmases; Jason Lee Forman, Jason R. Kerrigan, Bingbing Nie, David Poulard, Univ. of Virginia*

Time	Paper No.	Title

8:00 a.m.	***2017-01-1453***	***Pedestrian Head Impact Time Estimate based on Vehicle Geometric Parameters*** *Sudip Sankar Bhattacharjee, Shahuraj Mane, Harsha Kusnoorkar, Sean Hwang, Matt Niesluchowski, Ford Motor Company*
8:30 a.m.	***2017-01-1450***	***External Biofidelity Evaluation of Pedestrian Leg-Form Impactors*** *Daniel Perez-Rapela, Jason Forman, University of Virginia; Haeyoung Jeon, Hyundai Kia R&D; Jeff Crandall, University of Virginia*
9:00 a.m.	***2017-01-1451***	***Novel Approach in Vehicle Front-End Modeling for Numerical Analyses of Pedestrian Impact Scenarios*** *Jan Vychytil, Jan Spicka, Ludek Hyncik, University of West Bohemia; Jaroslav Manas, Mecas ESI s.r.o.; Petr Pavlata, Vision Consulting Automotive s.r.o.; Radim Striegler, Transport Research Centre; Tomas Moser, IDIADA CZ a.s.; Radek Valasek, Brano a.s.*

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 6

Occupant Protection: Structural Crashworthiness and Occupant Safety

Session Code: ***SS510***

Room 140 G ***Session Time:*** ***8:00 a.m.***

Presentations will cover critical issues in advancing the science of occupant safety in vehicle collisions.

Organizers - *Saeed Barbat, Jamel E. Belwafa, Ford Motor Company*

Chairpersons - *Saeed Barbat, Jamel E. Belwafa, Ford Motor Company*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1475***	***NHTSAâ€™s Proposed Frontal Oblique Impact Test Protocol: Analyses and Evaluation*** *Saeed Barbat, Xiaowei Li, Ford Motor Company*
8:30 a.m.	***2017-01-1468***	***Study of an Enhanced Body of Small Vehicle in Frontal Crash Test and IIHS Small Overlap Test*** *Do Hoi KIm, Hyundai Motor Corporation*
9:00 a.m.	***2017-01-1472***	***Modeling of Rivets Using a Cohesive Approach for Crash Simulation of Vehicles in RADIOSS*** *Niels Pasligh, Robert Schilling, Ford Motor Company; Marian Bulla, Altair Engeneering GmbH*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1473***	***Multi Objective Optimization of Vehicle Crashworthiness Based on Combined Surrogate Models*** *Ling Zheng, Yinan Gao, Zhenfei Zhan, Yinong Li, Chongqing University*
11:00 a.m.	***2017-01-1471***	***Occupant Injury Response Prediction Prior to Crash Based on Pre-Crash Systems*** *Xiao Luo, Wenjing Du, Hao Li, Peiyu LI, Chunsheng Ma, Shucai Xu, Jinhuan Zhang, Tsinghua University*
11:30 a.m.	***2017-01-1474***	***Responses of Rear Seat ATDs in Frontal Impact Sled Tests: Evaluation of Two Seat Belt Configurations*** *Raed E. El-Jawahri, Agnes Kim, Dean Jaradi, Rich Ruthinowski, Kevin Siasoco, Cortney Stancato, Para Weerappuli, Ford Motor Company*

Planned by Occupant Protection Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 6

Vehicle Aerodynamics (Part 5 of 6): Cooling and Rotating Flows

Session Code: ***SS800***

Room 141 ***Session Time:*** ***8:00 a.m.***

Paper offers on the following topics are welcome: test facilities, unsteady aerodynamics, fuel economy, cooling airflow, fundamental aerodynamics and aerodynamics development.

Organizers - *Edward G. Duell, Jacobs; Adrian P. Gaylard, Jaguar Land Rover; James T. McKillen, Honda; Kurt Zielinski, Honda R & D Americas Inc.*

Time	Paper No.	Title
8:00 a.m.	***2017-01-1529***	***Complete Body Aerodynamic Study of three Vehicles*** *Nicholas Simmonds, Cranfield University; John Pitman, Jaguar Land Rover; Panagiotis Tsoutsanis, Karl Jenkins, Cranfield University; Adrian Gaylard, Wilko Jansen, Jaguar Land Rover*
8:30 a.m.	***2017-01-1519***	***Further Analyses on Prediction of Automotive Spinning Wheel Flowfield with Full Width Moving Belt Wind Tunnel Results*** *Arturo Guzman, FCA US LLC; Young-Chang Cho, Exa Corporation; John Tripp, Kumar Srinivasan, FCA US LLC*
9:00 a.m.	***2017-01-1551***	***Aerodynamic Simulation of a Standalone Rotating Treaded Tire*** *Charlie Lew, Nath Gopalaswamy, Richard Shock, Bradley Duncan, James Hoch, Exa Corporation*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1520***	***Force Based Measurement Method for Cooling Flow Quantification*** *Teddy Hobeika, Chalmers Univ. of Technology; Peter Gullberg, Volvo Group Trucks Technology; Simone Sebben, Lennart Lofdahl, Chalmers Univ of Technology*
10:30 a.m.	***2017-01-1521***	***Aerodynamic Investigation of Cooling Drag of a Production Sedan Part 1: Test Results*** *Levon Larson, Sudesh Woodiga, Ronald Gin, Robert Lietz, Ford Motor Company*
11:00 a.m.	***2017-01-1528***	***Aerodynamic Investigation of Cooling Drag of a Production Sedan Part 2: CFD Results*** *Levon Larson, Ronald Gin, Robert Lietz, Ford Motor Company*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00576, and also individually. T purchase visit collections.sae.org

Planned by Vehicle Aerodynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 6

Vehicle Aerodynamics (Part 6 of 6): Fundamental Aerodynamics

Session Code: ***SS800***

Room 141 ***Session Time:*** ***1:00 p.m.***

Paper offers on the following topics are welcome: test facilities, unsteady aerodynamics, fuel economy, cooling airflow, fundamental aerodynamics and aerodynamics development.

Organizers - *Edward G. Duell, Jacobs; Gary M. Elfstrom, ACE-Durham Region; Adrian P. Gaylard, Jaguar Land Rover; Taeyoung Han, Bahram Khalighi, General Motors LLC; Kurt Zielinski, Honda R & D Americas Inc.*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1517***	***Effects of Installation Environment on Flow around Rear View Mirror*** *Haidong Yuan, Zhigang Yang, Qiliang Li, Tongji University*
1:30 p.m.	***2017-01-1540***	***Aerodynamic Drag of a Vehicle and Trailer Combination in Yaw*** *Yuri M. Lopes, Maxwell R. Taylor, Todd H. Lounsberry, Gregory J. Fadler, FCA US LLC*
2:00 p.m.	***2017-01-1548***	***The Effect of Passive Base Ventilation on the Aerodynamic Drag of a Generic SUV Vehicle*** *Max Varney, Martin Passmore, Loughborough University; Adrian Gaylard, Jaguar Land Rover*
2:30 p.m.	***2017-01-1536***	***The Effect of a Sheared Crosswind Flow on Car Aerodynamics*** *Jeff Howell, David Forbes, Martin Passmore, Gary Page, Loughborough University*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00576, and also individually. T purchase visit collections.sae.org

Planned by Vehicle Aerodynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 6

Load Simulation and Vehicle Performance: Ride ComfortÂ

Session Code: ***M207***

Room 142 A ***Session Time:*** ***8:00 a.m.***

This session focusing on vehicle ride comfort, addressing issues such as ride evaluation, suspension tuning, occupant biomechanics, seating dynamics, semi-active and active suspension and vehicle elastomeric components. Topics may include vehicle ride motion smoothness and control balancing, structural shake, impact harshness and after shake, brake judder/pulsation, smooth road shake/shimmy/nibble, power hop, launch shudder, freeway hop and any other phenomena affecting ride comfort.

Organizers - *Xuting Wu, General Motors LLC; Fangwu (Mike) Ma, Jilin University Automotive Engrg Colleg; James Yang, Texas Tech. Univ.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0411***	***Effects of Entrapped Gas within the Fluid on the Stiffness and Damping Characteristics of a Hydro-Pneumatic Suspension Strut*** *Yuming Yin, Subhash Rakheja, Concordia University Montreal; Jue Yang, University of Science and Technology Beijing; P-E. Boileau, IRSST*
8:30 a.m.	***2017-01-0409***	***A Study on Combined Effects of Road Roughness, Vehicle Velocity and Sitting Occupancies on Multi-Occupant Vehicle Ride Comfort Assessment*** *Divyanshu Joshi, Anindya Deb, Indian Institute of Science; Clifford Chou, Wayne State University*
9:00 a.m.	***2017-01-0407***	***Predicting the Head-Neck Posture and Muscle Force of the Driver Based on the Combination of Biomechanics with Multibody Dynamics*** *Fei Huo, Tongji University; Huyao Wu, University of Wisconsin Madison*
9:30 a.m.		***BREAK***

10:00 a.m.	***2017-01-0410***	***Effect of Road Disturbance on the Ride Performance of Twin Accumulator and Semi-Active Suspension Systems*** *Aref M. A. Soliman, Benha University*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 6

Vehicle Dynamics, Stability and Control (Part 5 of 5)

Session Code: ***SS900***

Room 142 B ***Session Time:*** ***8:00 a.m.***

This session is focused on vehicle dynamics and controls using modeling and simulation, and experimental analysis of passenger cars, heavy trucks, and wheeled military vehicles. This session addresses active and passive safety systems to mitigate rollover, yaw instability and braking issues; driving simulators and hardware-in-the-loop systems; suspension kinematics and compliance, steering dynamics, advanced active suspension technologies; and tire force and moment mechanics.

Organizers - *W. Riley Garrott, National Hwy Traffic Safety Admin; Paul Grygier; Gary J. Heydinger, SEA, Ltd.; David R. Mikesell, Ohio Northern Univ.; Sughosh J. Rao, M. Kamel Salaani, Transportation Research Center Inc.*

Chairpersons - *M. Kamel Salaani, Transportation Research Center Inc.; Paul Grygier*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1560***	***Vehicle Stability Criterion Research Based on Phase Plane Method*** *Wei Liu, Lu Xiong, Bo Leng, Haolan Meng, Renxie Zhang, Tongji University*
8:30 a.m.	***2017-01-1575***	***Evaluation of Stability and Control of Movement of 6x6 Truck for Different Operating Modes*** *Andrei Keller, Sergei Aliukov, Vladislav Anchukov, South Ural State University*
9:00 a.m.	***2017-01-1592***	***Effects of Active Aerodynamic Wings on Handling Performance of High-Speed Vehicles*** *Jingdong Cai, Saurabh Kapoor, Tushita Sikder, Yuping He, Univ. of Ontario Institute of Technology*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1563***	***Experimental and Simulation Studies on Instability of a Two Wheeler Vehicle*** *Abhijeet Behera, Murugan Sivalingam, NIT Rourkela, Odisha, India*
10:30 a.m.	***2017-01-1585***	***A Nonlinear Dynamic Control Design with Conditional Integrators Applied to Unmanned Skid-steering Vehicle*** *Renxie Zhang, Lu Xiong, Automotive College, Tongji University; Zhuoping Yu; Wei Liu, Automotive College, Tongji University*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00575, and also individually. T purchase visit collections.sae.org

Planned by Vehicle Dynamics Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 6

Applications of Advanced High-Strength Steels and Press Hardening for Automotive Structures (Part 1 of 2)

Session Code: ***M104***

Room 142 C ***Session Time: 8:00 a.m.***

This session provides a forum for researchers and application engineers to disseminate the knowledge and information gained in advanced high-strength and press-hardening steel development and applications in automotive structures, enabling light-weight and durable vehicles with improved safety.

Organizers - *Jason Coryell, General Motors LLC; Constantin Chiriac, Ford Motor Company; Jatinder P. Singh, General Motors LLC*

Time	Paper No.	Title
8:00 a.m.	***ORAL ONLY***	***Technical Keynote: AHSS vs. Hot Forming â€“ New Processes Create New Possibilities*** *Fritz Ebner, Ebner Furnaces Inc.*
9:00 a.m.	***ORAL ONLY***	***Weight Reductions in Automotive Body with AK Steelâ€™s New Advanced High Strength Steel Grades, NEXMETâ„¢ 1000 and NEXMETâ„¢ 1200*** *Jay Choi, AK Steel Corp.*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1707***	***Retained Austenite Stability and Impact Performance of Advanced High Strength Steel at Reduced Temperatures*** *C. Matthew Enloe, General Motors LLC; Jeff Wang, General Motors Global Research and Development; Jason Coryell, General Motors LLC*
10:30 a.m.	***2017-01-1704***	***New Mechanisms Governing Local Formability In 3rd Generation AHSS*** *D.J. Branagan, A.E. Frerichs, B.E. Meacham, S. Cheng, A.V. Sergueeva, The NanoSteel Company*
11:00 a.m.	***ORAL ONLY***	***Modification of Yoshida-Uemori Model with Consideration of Transformation-Induced Plasticity Effect*** *Jun Hu, Clemson Univ.; Lay Ong Knoerr, ThyssenKrupp Steel USA LLC; Fadi Abu-Farha, Clemson Univ.*

Planned by Metallic Materials Committee / Materials Engineering Activity

Thursday, April 6

Applications of Advanced High-Strength Steels and Press Hardening for Automotive Structures (Part 2 of 2)

Session Code: ***M104***

Room 142 C ***Session Time: 1:00 p.m.***

This session provides a forum for researchers and application engineers to disseminate the knowledge and information gained in advanced high-strength and press-hardening steel development and applications in automotive structures, enabling light-weight and durable vehicles with improved safety.

Organizers - *Jason Coryell, General Motors LLC; Constantin Chiriac, Ford Motor Company; Jatinder P. Singh, General Motors LLC*

Time	Paper No.	Title
1:00 p.m.	***ORAL ONLY***	***Empirical Equations for Prediction of Phase Transformation Temperatures of 22MnB5 Boron Steel based on the Chemical Composition, Incoming Microstructure and Heating Rate*** *Constantin Chiriac, Ford Motor Company*

1:30 p.m.	***2017-01-1705***	***Effects of Punch Configuration on the AHSS Edge Stretchability*** *Hua-Chu Shih, United States Steel Corp.; Dajun Zhou, FCA US LLC; Bruce Konopinski, PCS Company*
2:00 p.m.	***2017-01-1708***	***Sheared Edge Stretchability of Steels Suitable for Automotive Applications*** *Saeid Nasheralahkami, Sergey Golovashchenko, Collin Malek, Oakland University; Erika Rugh, Sweet Briar College; Daniel Kowalsky, Weitian Zhou, Oakland University*
2:30 p.m.	***ORAL ONLY***	***A Comparison between Different Digital Image Correlation based Techniques for Determining the Forming Limits of Advanced-High Strength Steels*** *Jun Hu, Clemson Univ.; Rohit K. Singh; Fadi Abu-Farha, Clemson Univ.*
3:00 p.m.	***2017-01-1706***	***Wear of D2 Tool Steel Dies during Trimming DP980-type Advanced High Strength Steel (AHSS) for Automotive Parts*** *Sandeep Bhattacharya, Daniel Green, University of Windsor; Raj Sohmshetty, Ford Motor Company; Ahmet Alpas, University of Windsor*
3:30 p.m.	***2017-01-1703***	***Fe-Mn-Al-C Alloy Steels â€“ A New Armor Class*** *Ryan A. Howell, US Army; Richard Gerth, US Army TARDEC*
4:00 p.m.	***2017-01-1709***	***Development of Lightweight Hanger Rods for Vehicle Exhaust Applications*** *Zhigang Wei, Sarat Das, Ryan Barr, Greg Rohrs, Robert Rebandt, Tenneco Inc.; Xiao Wu, University of Michigan-Dearborn; HongTae Kang, University of Michigan_Dearborn*

Planned by Metallic Materials Committee / Materials Engineering Activity

Thursday, April 6

Gaseous Engine Emissions (Part 1 of 2)

Session Code: ***PFL460***

Room 250 A ***Session Time:*** ***8:00 a.m.***

Papers for this session are on the general topics of combustion engine gaseous emissions (regulated and non-regulated). This includes papers discussing well-to-wheels CO2 production for alternative technologies, fuel economy and all greenhouse gas emission research with their primary focus on engine, emissions, fuels, control or related components or sub-components within. It also includes hydrocarbon species and specific NOx species production over aftertreatment devices.

Organizers - *Behnam Bahrami, Krishna Kamasamudram, Cummins Inc.; Siddiq Khan, ACEEE; Ashok Kumar, Cummins Inc.; Mansour Masoudi, Emissol LLC; Rachel L. Muncrief*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1016***	***Potential Fuel Economy Improvements from the Implementation of cEGR and CDA on an Atkinson Cycle Engine*** *Charles Schenk, Paul Dekraker, US Environmental Protection Agency*
8:30 a.m.	***2017-01-1017***	***Formation of Engine Internal NO₂: Measures to Control the NO₂/NO_X Ratio for Enhanced Exhaust After Treatment*** *Michael RÃ¶mer, Amin Velji, Corina Janzer, Thomas Koch, Matthias Olzmann, Karlsruhe Institute Of Technology*
9:00 a.m.	***2017-01-1019***	***The Impact of Pre-Turbine Catalyst Placement on Methane Oxidation in Lean-Burn Gas Engines: An Experimental and Numerical Study*** *Bentolhoda Torkashvand, Andreas Gremminger, Simone Valchera, Maria Casapu, Jan-Dierk Grunwaldt, Olaf Deutschmann, Karlsruhe Institute of Technology (KIT)*

10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1014***	***Evolution of Engine Air Induction System Hydrocarbon Traps*** *David Moyer, Roger Khami, Andrew Bellis, Thomas Luley, Ford Motor Company*
11:00 a.m.	***2017-01-1013***	***On-Road Vehicle Driving and Energy Requirements and Impact on Unregulated Exhaust Emissions under Urban Driving Conditions*** *Sunil Kumar Pathak, Yograj Singh, Vineet sood, CSIR- Indian Institute of Petroleum; Salim Abbasbhai Channiwala, S V National Institute of Technology*
11:30 a.m.	***ORAL ONLY***	***Gaseous and Particulate emissions from Passenger Cars Operating with Low Sulfur Diesel (PEMEX)*** *Jiacheng Yang, Mark Villela, Thomas Durbin, George Karavalakis, University Of California Riverside*
12:00 p.m.	***2017-01-1011***	***Greenhouse Gas Emission Inventory from Indian transport sector***
	ORAL ONLY	*Sunil Pathak, Vineet sood, Yograj Singh, CSIR- Indian Institute of Petroleum; Salim Abbasbhai Channiwala, S V National Institute of Technology*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Gaseous Engine Emissions (Part 2 of 2)

Session Code: ***PFL460***

Room 250 A ***Session Time:*** ***1:30 p.m.***

Papers for this session are on the general topics of combustion engine gaseous emissions (regulated and non-regulated). This includes papers discussing well-to-wheels CO2 production for alternative technologies, fuel economy and all greenhouse gas emission research with their primary focus on engine, emissions, fuels, control or related components or sub-components within. It also includes hydrocarbon species and specific NOx species production over aftertreatment devices.

Organizers - *Behnam Bahrami, Krishna Kamasamudram, Cummins Inc.; Siddiq Khan, ACEEE; Ashok Kumar, Cummins Inc.; Mansour Masoudi, Emissol LLC; Rachel L. Muncrief*

Time	***Paper No.***	***Title***
1:30 p.m.	***ORAL ONLY***	***Hydrogen / Diesel Dual Fuel Engine Operation for a CHP System Using Organic Chemical Hydride*** *Taku Tsujimura, National Institute of AIST*
2:00 p.m.	***2017-01-1020***	***Model Based Engine-Off Natural Vacuum Leak Detection Monitor*** *Finn Tseng, Imad Makki, Pankaj Kumar, Robert Jentz, Aed Dudar, Ford Motor Company*
2:30 p.m.	***2017-01-1012***	***Impact of â€œBreak Inâ€ Running on Exhaust Emissions and Fuel Consumption of a Portable Genset*** *Sunil Kumar Pathak, Vineet sood, Yograj Singh, CSIR- Indian Institute of Petroleum; Salim Abbasbhai Channiwala, S V National Institute of Technology*
3:00 p.m.	***2017-01-1018***	***Computational Fluid Dynamics Study of Gaseous Ammonia Mixing in an Exhaust Pipe Using Static Mixers*** *Gianluca Padula, Philipp Schiffmann, Matthieu Lecompte, Olivier Laget, IFP Energies nouvelles, Institut Carnot IFPEN TE*

3:30 p.m.	***~~2017-01-1010~~ ORAL ONLY***	***The Influence of Magnetic Fields on the Process of Air Fuel Mixing and Environmental Performance of the Petrol Engine*** *Vera Morozova PhD, South Ural State University; Sergey P. Gladyshev, Univ. of Michigan-Dearborn; Valentina Gun PhD, Vladimir Polyatsko cEng, Tatiana Lonzinger PhD, South Ural State University*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Particle Emissions from Combustion Sources (Part 3 of 3)

Session Code: ***PFL450***

Room 250 B ***Session Time:*** ***8:00 a.m.***

This technical session addresses particle emissions from combustion engines, including measurement and testing methods, and the effects of changes in fuel composition. Also included are topics on environmental and health effects of elemental carbon and organic carbon that constitutes solid cored particles plus the environmental and health effects of secondary organic aerosol emissions. This encompasses particulate emissions from both gasoline and diesel engines.

Organizers - *Imad A. Khalek, Southwest Research Institute; Amanda Lea-Langton, Univ. of Manchester; Matti Maricq, Ford Motor Company; Andrea Strzelec, Texas A&M University*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1000***	***Emission Performance of Low Cetane Naphtha as Drop-In Fuel on a Multi-Cylinder Heavy Duty Diesel Engine and Aftertreatment System*** *Jong Lee, Yu Zhang, Tom Tzanetakis, Michael Traver, Aramco Research Center; Melanie Moses-DeBusk, John Storey, William Partridge, Michael Lance, Oak Ridge National Laboratory*
8:30 a.m.	***2017-01-1003***	***Surface Functional Groups and Graphitization Degree of Soot in the Sooting History of Methane Premixed Flame*** *Ye Liu, Gang Lv, Chenyang Fan, Na Li, Xiaowei Wang, Tianjin University*
9:00 a.m.	***2017-01-1009***	***Effects of Lubricating Oil Metallic Content on Morphology, Nanostructure and Graphitization Degree of Diesel Engine Exhaust Particles*** *Yajun Wang, Tianjin University; Xingyu Liang, State Key Lab Of Engines; Yuesen Wang, Xiuxiu Sun, Hanzhengnan Yu, Xikai Liu, Tianjin University*
9:30 a.m.	***2017-01-1004***	***Nanoparticle Emissions of DI Gasoline Cars with/without GPF*** *Jan Czerwinski, Pierre Comte, University of Applied Sciences Biel-Bienne; Norbert Heeb, EMPA; Andreas Mayer, TTM; Volker Hensel, Aurigna Consulting GmbH*
10:00 a.m.		***BREAK***

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Thermal Systems Modeling and Simulation (Part 1 of 2)

Session Code: ***HX102***

Room 250 C ***Session Time:*** ***8:00 a.m.***

The Thermal Systems Modeling and Simulation session focusses on state of the art simulation technologies for modeling thermal systems and their application in the development and optimization of vehicle thermal management and fuel economy. The papers in the session will range from empirical, 1D modeling methods to three dimensional CFD models as well as coupled methods.

Organizers - *Ales Alajbegovic, Exa Corporation; Alaa El-Sharkawy, FCA US LLC; Wilko Jansen, Jaguar & Land Rover; Vamshi Korivi, TARDEC; Jason Aaron Lustbader, National Renewable Energy Laboratory; Gursaran D. Mathur, CalsonicKansei North America Inc.; Kumar Srinivasan, FCA US LLC; Sudhi Uppuluri, Computational Sciences Experts Group*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0141***	***Exhaust System Thermal Management: A Process to Optimize Exhaust Enthalpy for Cold Start Emissions Reduction*** *Ray Host, Peter Moilanen, Marcus Fried, Bhageerath Bogi, Ford Motor Company*
8:30 a.m.	***2017-01-0134***	***A New Approach to Predicting Component Temperature Collectives for Vehicle Thermal Management*** *Jan Eller, FKFS / IVK University of Stuttgart; Heinrich Reister, Thomas Binner, Daimler AG; Nils Widdecke, Jochen Wiedemann, FKFS / IVK University of Stuttgart*
9:00 a.m.	***2017-01-0135***	***Design Procedure for Robust Design of CV EGR Coolers Against Thermal Fatigue*** *Jose Grande, Julio Abraham Carrera, Manuel Dieguez Sr, BorgWarner Emissions Systems*
9:30 a.m.	***2017-01-0147***	***Experimental and Numerical Investigation of Vehicle Drive and Thermal Soak Conditions in a Simplified Engine Bay*** *Brian Sweetman, Ford Motor Company; Ingo Schmitz, AVL Schrick GmbH; Burkhard Hupertz, Nathanael Shaw, John Goldstein, Ford Motor Company*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0130***	***Calibration and Demonstration of Vehicle Powertrain Thermal Management Using Model Predictive Control*** *Phillip Bonkoski, Amey Y. Karnik, Ford Motor Company; Adrian Fuxman, Honeywell Automotive Software*

Planned by Thermal Management Activity / EMB Land and Sea Group

Thursday, April 6

Thermal Systems Modeling and Simulation (Part 2 of 2)

Session Code: ***HX102***

Room 250 C ***Session Time:*** ***1:30 p.m.***

The Thermal Systems Modeling and Simulation session focusses on state of the art simulation technologies for modeling thermal systems and their application in the development and optimization of vehicle thermal management and fuel economy. The papers in the session will range from empirical, 1D modeling methods to three dimensional CFD models as well as coupled methods.

Organizers - *Ales Alajbegovic, Exa Corporation; Alaa El-Sharkawy, FCA US LLC; Wilko Jansen, Jaguar & Land Rover; Vamshi Korivi, TARDEC; Jason Aaron Lustbader, National Renewable Energy Laboratory; Gursaran D. Mathur, CalsonicKansei North America Inc.; Kumar Srinivasan, FCA US LLC; Sudhi Uppuluri, Computational Sciences Experts Group*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0136***	***Effect of an ORC Waste Heat Recovery System on Diesel Engine Fuel Economy for Off-Highway Vehicles*** *Apostolos Karvountzis-Kontakiotis, Apostolos Pesiridis, Hua Zhao, Fuhaid Alshammari, Brunel University London; Benjamin Franchetti, Ioannis Pesmazoglou, Lorenzo Tocci, Entropea Labs Ltd*

2:00 p.m.	***2017-01-0131***	***Modeling of Phase Change within a Wax Element Thermostat Embedded in an Automotive Cooling System*** *Chiranth Srinivasan, Chonglin Zhang, Haiyang Gao, De Ming Wang, Simerics Inc; Jody Slike, Ford Motor Company*
2:30 p.m.	***2017-01-0133***	***Transient Power Optimization of an Organic Rankine Cycle Waste Heat Recovery System for Heavy-Duty Diesel Engine Applications*** *Bin Xu, Adamu Yebi, Simona Onori, Zoran Filipi, Clemson-ICAR; Xiaobing Liu, John Shutty, Paul Anschel, BorgWarner Inc.; Mark Hoffman, Clemson-ICAR*
3:00 p.m.	***2017-01-0137***	***Development of the Large Type Electric-Driven Refrigerator for the HV Truck*** *Akira Ando, Koichi Hamashima, Shinji Kato, Noriyuki Tomita, Takahiro Uejima, DENSO Corporation*
3:30 p.m.	***2017-01-0145***	***Development of a High Fidelity CAE Model for Predicting Brake System Temperatures*** *Edward Palmer, Wilko Jansen, Jaguar Land Rover*

Planned by Thermal Management Activity / EMB Land and Sea Group

Thursday, April 6

Combustion in Compression-Ignition Engines: Fuel/Additive Effects

Session Code: ***PFL223***

Room 251 A ***Session Time:*** ***8:00 a.m.***

Papers focusing on fuel and fuel additive effects on classical diesel engine combustion with relatively short ignition delay, including papers dealing with low compression ratio and high exhaust-gas recirculation calibrations. Subject matter may include both experimental and simulation results focused on oxygenated or bio-derived fuels, alternative petroleum formulations, fuel blends, or any other fuel-related factors affecting engine performance and emissions.

Organizers - *Raul Payri, Jose M Garcia-Oliver, Universitat Politecnica de Valencia; Dale R. Tree, Brigham Young Univ.; Song-Charng Kong, Iowa State Univ.; Yongli Qi, Caterpillar Inc.; John F. Wright, Cummins Inc.; Ming Zheng, Univ. of Windsor; Mark P. B. Musculus, Sandia National Laboratories; Robert M. McDavid, Caterpillar Inc.*

Chairpersons - *Greg Roberts, Sandia National Laboratories; Shui Yu, Univ. of Windsor*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0705***	***Next Improvement Potentials for Heavy-Duty Diesel Engine - Tailor the Fuel Injection System to the Combustion Needs*** *Jost Weber, Olaf Herrmann, Ron Puts, DENSO AUTOMOTIVE Deutschland GmbH; Jyun Kawamura, Yasufumi Tomida, Makoto Mashida, DENSO CORPORATION*
8:30 a.m.	***2017-01-0696***	***Mixing-Controlled Combustion of Conventional and Higher Reactivity Gasolines in a Multi-Cylinder Heavy-Duty Compression Ignition Engine*** *Yu Zhang, Steven Sommers, Yuanjiang Pei, Praveen Kumar, Alexander Voice, Michael Traver, David Cleary, Aramco Research Center*
9:00 a.m.	***2017-01-0699***	***Direct Injection Compression Ignition Engine: Cold Start on Gasoline and Diesel*** *Sampad Mukhopadhyay, Sunil Srinivas Badavath, Naeim Henein, Wayne State University*

9:30 a.m.	***2017-01-0715***	***Reference and Pure Component Fuel Characterization in an Ignition Quality Tester Derived Cetane Rating Unit*** *Peter Luning Prak, Len Hamilton, Dianne Luning-Prak, Jim Cowart, US Naval Academy*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0721***	***Experimental Methodology for the Understanding of Soot-Fuel Relationship in Diesel Combustion: Fuel Characterization and Surrogate Validation*** *Michele Bardi, Gilles Bruneaux, AndrÃ©Nicolle, Olivier Colin, IFP Energies nouvelles-Institut Carnot*
11:00 a.m.	***2017-01-0720***	***Performance Evaluation of the Ignition Quality Testers Equipped with TALM Precision Package (TALM-IQTâ,¢) Participating in the ASTM NEG Cetane Number Fuel Exchange Program*** *Omar Ramadan, Luc Menard, David Gardiner, Aaron Wilcox, Gary Webster, Advanced Engine Technology Ltd.*
11:30 a.m.	***2017-01-0719***	***Experimental Investigation on the Combustion and Emissions Characteristics of n-Butanol / GTL and n-Butanol/Diesel Blends in a Single-Cylinder MD-CI Engine*** *Martin Muinos, Valentin Soloiu, Jose Moncada, Remi Gaubert, Gustavo Molina, Johnnie Williams, Georgia Southern University*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Dilute SI Combustion (Stratified Charge, EGR)

Session Code: ***PFL216***

Room 251 B ***Session Time:*** ***8:00 a.m.***

This session focuses on the dilute SI combustion processes including lean, stratified, and EGR operation. Papers cover both 4-stroke and 2-stroke engines characterized by 1) ignition by an external energy source that serves to control combustion phasing, and 2) a combustion rate that is limited by flame propagation.

Organizers - *Thomas Edward Briggs, Southwest Research Institute; Richard S. Davis, General Motors LLC; Adrian Irimescu, Istituto Motori CNR; Brian C. Kaul, Oak Ridge National Laboratory*

Chairpersons - *Brian Kaul, Oak Ridge National Laboratory; Thomas Briggs, Southwest Research Institute*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0684***	***The Impact of Engine Operating Conditions on Reformate Production in a D-EGR Engine*** *Vickey B. Kalaskar, Raphael Gukelberger, Bradley Denton, Thomas Briggs, Southwest Research Institute*
8:30 a.m.	***2017-01-0681***	***Determination of SI Combustion Sensitivity to Fuel Perturbations as a Cyclic Control Input for Highly Dilute Operation*** *Gurneesh S. Jatana, Brian C. Kaul, Oak Ridge National Laboratory*
9:00 a.m.	***2017-01-0683***	***Clean EGR for Gasoline Engines â€“ Innovative Approach to Efficiency Improvement and Emissions Reduction Simultaneously*** *Michael Fischer, Philipp Kreutziger, Yong Sun, Adam Kotrba, Tenneco Inc.*
9:30 a.m.	***2017-01-0682***	***Comparison of Fuel Economy Improvement by High and Low Pressure EGR System on a Downsized Boosted Gasoline Engine*** *Yuedong Chao, Haifeng Lu, Zongjie Hu, Jun Deng, Zhijun Wu, Liguang Li, Tongji Univ; Yuan Shen, Shuang Yuan, Geely Powertrain Research Institute*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Spark Assisted Compression Ignition, SACI

Session Code: ***PFL240***

Room 251 B ***Session Time:*** ***10:30 a.m.***

Mixed modes with both flame propagation and slow auto ignition. Distinct from SI knock: autoignition is desired and will not ruin the engine. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, and SACI mode change are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL 110 or PFL120 modeling sessions.

Organizers - *Janardhan Kodavasal, Argonne National Laboratory; Sotirios Mamalis, Stony Brook Univ.*

Time	Paper No.	Title
10:30 a.m.	2017-01-0737	***Experimental Comparison between Stratified Flame Ignition and Micro Flame Ignition in a Gasoline SI-CAI Hybrid Combustion Engine*** *Tao Chen, Hui Xie, Hongtao Li, Xueqing Fu, Tianjin University; Hua Zhao, Brunel University*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Cold Start and Transients

Session Code: ***PFL290***

Room 251 B ***Session Time:*** ***1:30 p.m.***

This session focuses on both SI and CI combustion and mixture preparation during cold start and transient engine operation. Example topics include engine performance, emissions, control strategies and calibrations for cold start and transient operation impact on NOx, PM, HC, CO, and CO2 emissions; also including the impact of variable valve timing, spark, and turbocharger controls.

Organizers - *Eric W. Curtis, Peter Moilanen, Ford Motor Company; Ouafae Mourlan; Hamid Servati, ServoTech. Industries*

Time	Paper No.	Title
1:30 p.m.	2017-01-0795	***Assessment of Gasoline Direct Injection Engine Cold Start Particulate Emission Sources*** *Changhoon Oh, Wai K. Cheng, Massachusetts Institute of Technology*
2:00 p.m.	2017-01-0796	***Analysis of NOx Emissions during Crank-Start and Cold Fast-Idle in a GDI Engine*** *J. Felipe Rodriguez, Wai K. Cheng, Massachusetts Institute of Technology*
2:30 p.m.	2017-01-0797	***Autoignition and Combustion of ULSD and JP8 during Cold Starting of a High Speed Diesel Engine*** *Sahil Sane, Tamer Badawy, Naeim Henein, Wayne State University*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 6

High Efficiency IC Engines Concepts (Part 3 of 3)

Session Code: ***PFL170***

Room 251 C ***Session Time: 8:00 a.m.***

This session focuses on technologies such as advanced and partially mixed combustion, cooled EGR boosting, ignition and direct injection technologies, pressure boosting, intelligent combustion, thermal efficiency, fully variable valvetrains, and other new and developing technologies. Papers focused on waste heat recovery technologies should be submitted to HX102/103.

Organizers - *Alessandro D'Adamo; Yichao Guo, Ford Motor Co., Ltd.; Mark Joseph Monohon, NGK Spark Plugs (USA) Inc.; Vasudha Patri, Argonne National Laboratory; David B. Roth, BorgWarner Inc.; James P. Szybist, Oak Ridge National Laboratory; Alok Warey, General Motors Global R & D*

Time	Paper No.	Title
8:00 a.m.	2017-01-0637	**The Reduction of Mechanical and Thermal Loads in a High-Speed HD Diesel Engine Using Miller Cycle with Late Intake Valve Closing** *Yan Zhang, Ziyu Wang, Honglin Bai, Chao Guo, Jinlong liu, Yufeng Li, China North Engine Research Institute*
8:30 a.m.	2017-01-0645	**Design of a Fuel-Efficient Two-Stroke Diesel Engine for Medium Passenger Cars: Comparison between Standard and Reverse Uniflow Scavenging Architectures** *Jeremy Galpin, Thierry Colliou, IFP Energies nouvelles, Institut Carnot; Olivier Laget, IFP Energies nouvelles, Institut Carnot IFPEN TE; Fabien Rabeau, Gaetano De Paola, IFP Energies nouvelles, Institut Carnot; Pascal Rahir, Groupe Renault*
9:00 a.m.	2017-01-0638	**Developing a 55% BTE Commercial Heavy-Duty Opposed-Piston Engine without a Waste Heat Recovery System** *Neerav Abani, Achates Power Inc.; Nishit Nagar, Rodrigo Zermeno, Michael chiang, Isaac Thomas, Achates Power Inc*
9:30 a.m.	2017-01-0636	**Optimum Heat Release Rates for a Double Compression Expansion (DCEE) Engine** *Vijai Shankar Bhavani Shankar, King Abdullah Univ of Science & Tech; Nhut Lam, Lund University; Arne Andersson, Volvo Cars of North America LLC; Bengt Johansson, King Abdullah Univ of Science & Tech*
10:00 a.m.		**BREAK**
10:30 a.m.	2017-01-0633	**Thermodynamic Analysis of a 5 Stroke Engine with Heat Transfer and Mass Loss** *Kurt Stuart, Terry Yan, Southern Illinois Univ Edwardsville; James Mathias, Southern Illinois Univ at Carbondale*
11:00 a.m.	2017-01-0644	**Most Recent Discussion of the Performance and Emissions Produced by a Stratified Torch Ignition Prototype Engine Fuelled by a Blend of Ethanol and Gasoline** *Michael Pontoppidan, Numidis Sarl; Adm JosÃ©baeta, Federal University of Minas Gerais*
11:30 a.m.	2017-01-0649	**Study of the Combustion Characteristics of a HCCI Engine Coupled with Oxy-Fuel Combustion Mode** *Zhe Kang, Zhijun Wu, Zhehao Zhang, Jun Deng, Zongjie Hu, Liguang Li, Tongji University*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Fuel Injection and Sprays (Part 5 of 8)

Session Code: PFL320

Room 252 A ***Session Time: 8:00 a.m.***

This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of both gasoline and diesel fuel sprays and fuel injection equipment are encouraged.

Organizers - *Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Shyam Menon, Louisiana State University; Michele Battistoni, Universita degli Studi di Perugia; Julien Manin, Sandia National Laboratories*

Chairpersons - *Michele Battistoni, Universita degli Studi di Perugia; Sibendu Som, Argonne National Laboratory*

Time	Paper No.	Title
8:00 a.m.	2017-01-0824	**High-Resolution X-Ray and Neutron Computed Tomography of an Engine Combustion Network Spray G Gasoline Injector** *Daniel J. Duke, Argonne National Laboratory; Charles E.A. Finney, Oak Ridge National Laboratory; Alan Kastengren, Katarzyna Matusik, Nicolas Sovis, Argonne National Laboratory; Louis Santodonato, Hassina Bilheux, Oak Ridge National Laboratory; David Schmidt, University of Massachusetts; Christopher Powell, Argonne National Laboratory; Todd Toops, Oak Ridge National Laboratory*
8:30 a.m.	2017-01-0835	**New spray concept development for dual injection system** *Hitoshi Shibata, Takeshi Mizobuchi, Makoto Iwamuro, Akinori Koda, Hidekazu Omura, DENSO Corporation*
9:00 a.m.	2017-01-0840	**Experimental and Numerical Analysis of a High-Pressure Outwardly Opening Hollow Cone Spray Injector for Automotive Engines** *Carlo Beatrice, Marianna Migliaccio, Alessandro Montanaro, Valentina Fraioli, Pierpaolo Napolitano, Luigi Allocca, Istituto Motori CNR*
9:30 a.m.	2017-01-0853	**Comparison of In-Nozzle Flow Characteristics of Naphtha and N-Dodecane Fuels** *Roberto Torelli, Sibendu Som, Argonne National Laboratory; Yuanjiang Pei, Yu Zhang, Alexander Voice, Michael Traver, David Cleary, Aramco Research Center*
10:00 a.m.		**BREAK**
10:30 a.m.	2017-01-0854	**An experimental and numerical study of diesel spray impingement on a flat plate** *Le Zhao, Michigan Technological University; Roberto Torelli, Argonne National Laboratory; Xiucheng Zhu, Michigan Technological University; Riccardo Scarcelli, Sibendu Som, Argonne National Laboratory; Henry Schmidt, Jeffrey Naber, Seong-Young Lee, Michigan Technological University*
11:00 a.m.	2017-01-0856	**Experimental and Numerical Study of the Liquid Film Separation and Atomization at Expanding Corners** *Yanzhi Zhang, Ming Jia, Huiquan Duan, Pengfei Wang, Jianxiang Wang, Hong Liu, MaoZhao Xie, Dalian University of Technology*
11:30 a.m.	2017-01-0860	**Hole Geometrical Effect on Internal Flow, Fuel Atomization and Spray Evaporation of Multi-Hole Nozzle for Diesel Engine** *PengBo Dong, Jun Yamauchi, Keiya Nishida, Youichi Ogata, University of Hiroshima*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Fuel Injection and Sprays (Part 6 of 8)

Session Code: ***PFL320***

Room 252 A ***Session Time:*** ***1:30 p.m.***

This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of both gasoline and diesel fuel sprays and fuel injection equipment are encouraged.

Organizers - *Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Shyam Menon, Louisiana State University; Michele Battistoni, Universita degli Studi di Perugia; Julien Manin, Sandia National Laboratories*

Chairpersons - *Essam El-Hannouny, Argonne National Laboratory*

Time	Paper No.	Title
1:30 p.m.	2017-01-0845	**Realizing Robust Combustion with High Response Diesel Injector with Controlled Diffusive Spray Nozzle and Closed Loop Injection Control** *Kazufumi Serizawa, Daiji Ueda, Naoki Mikami, Yasufumi Tomida, DENSO Corporation; Jost Weber, DENSO Automotive GmbH*
2:00 p.m.	2017-01-0823	**A Methodology for the Estimation of Hole-to-Hole Injected Mass Based on Spray Momentum Flux Measurement** *Alessandro Mariani, Loccioni Group; Andrea Cavicchi, Lucio Postrioti, Universita degli Studi di Perugia; Carmine Ungaro, Loccioni Group*
2:30 p.m.	2017-01-0819	**1D Model for Correcting the Rate of Injection Signal Based on Geometry and Temperature Influence** *David van Bebber, Uwe Reuter, Ford Motor Company*
3:00 p.m.	2017-01-0830	**Experimental Assessment of a Novel Instrument for the Injection Rate Measurement of Port Fuel Injectors in Realistic Operating Conditions** *Lucio Postrioti, Universita degli Studi di Perugia; Giulio Caponeri, UniversitÃ degli Studi di Perugia; Giacomo Buitoni, Shot-to-Shot Engineering; Nic Van Vuuren, Continental Automotive Systems US Inc.*
3:30 p.m.	2017-01-0828	**Study on Pressure Fluctuation of a Constant Pressure Fuel System** *Dongwei Wu, Beijing Institute of Technology; Baigang Sun, Collaborative Innovation Center of EV; Dan Xu, Xiaodong An, Yunshan Ge, Beijing Institute of Technology*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Transmission Systems/Drive Unit

Session Code: ***PFL610***

Room 252 B ***Session Time:*** ***8:00 a.m.***

This session deals with the automotive transmissions of different types. It includes development of new transmission concepts, transmission enhancements and the advancement of the state of the art of transmission system design & integration with the objective of improving the transmission efficiency, NVH, durability and shift pleaseability.

Organizers - *Berthold Martin, FCA US LLC; Tejinder Singh*

Chairpersons - *Azadeh Narimissa, General Motors LLC*

Time	Paper No.	Title

8:00 a.m.	***2017-01-1094***	***Shift-by-Wire System for Lexus RWD Vehicles*** *Yusuke Nakade, Atsushi Kamada, Koki Ueno, Toyota Motor Corporation; Mikine Kume, Kouji Sakaguchi, DENSO Corporation*
8:30 a.m.	***2017-01-1099***	***Development of Innovative Toyota 10-Speed Longitudinal Automatic Transmission*** *Seiji Masunaga, Terufumi Miyazaki, Yohei Habata, Kazuhiko Yamada, Yoshio Hasegawa, Takahiro Kondo, Ichiro Kitaori, Akira Takeichi, Toyota Motor Corporation*
9:00 a.m.	***2017-01-1095***	***In-Situ Measurement of Transmission Efficiency in Vehicles*** *Sankar B. Rengarajan, Jayant Sarlashkar, Peter Lobato, Southwest Research Institute*
9:30 a.m.	***2017-01-1098***	***Concept and Approach of Multi Stage Hybrid Transmission*** *Tatsuya Imamura, Atsushi Tabata, Tooru Matsubara, Yuji Iwase, Kenta Kumazaki, Keita Imai, Toyota Motor Corporation*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1097***	***New RWD 10 Speed Automatic Transmission for Passenger Vehicles*** *Tomohide Suzuki, Hiroyuki Sugiura, Atsushi Niinomi, Shingo Maezuka, Aisin AW Co., Ltd.; Terufumi Miyazaki, Yohei Habata, Toyota Motor Corp.*
11:00 a.m.	***2017-01-1096***	***Agile and Low-Cost Experimental Evaluation of Fuel Consumption Reduction of a New Electrified Clutch Transmission Virtually Connected to a Vehicle*** *Robin Temporelli, Philippe Micheau, Maxime Boisvert, University of Sherbrooke*
11:30 a.m.	***2017-01-1092***	***Predictive Transmission Shift Schedule for Improving Fuel Economy and Drivability Using Electronic Horizon*** *Jianbo Lu, Sanghyun Hong, Jonathan Sullivan, Guopeng Hu, Edward Dai, Dennis Reed, Ryan Baker, Ford Motor Company*
12:00 p.m.	***2017-01-1093***	***Toyota New TNGA High-Efficiency Eight-Speed Automatic Transmission Direct Shift-8AT for FWD Vehicles*** *Yosuke Michikoshi, Daisuke Kusamoto, Hirofumi Ota, Masashi Ikemura, Noritaka Takebayashi, Toyota Motor Corporation; Ike Nobukazu, Yasuda Takashi, Inoue Ryohei, Aisin AW Co., Ltd.*

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Launch Devices

Session Code: ***PFL650***

Room 252 B ***Session Time:*** ***1:30 p.m.***

This Session includes papers on torque converter, launch devices and modeling.

Organizers - *Michael E. Fingerman, Brandon Otulakowski, FCA US LLC*

Time	***Paper No.***	***Title***
10:00 a.m.		***BREAK***

1:30 p.m.	***2017-01-1118***	***Development of Compact Torque Converter with New Multiple Disk Clutch for Toyota New FWD Eight-Speed Transmission Direct Shift-8AT*** *Isamu Hachisuwa, Naoki Kato, Daisuke Kusamoto, Hideki Miyata, Takuya Okada, Hitoshi matsunaga, Toyota Motor Corporation; Takamitsu Kuroyanagi, Makoto nakazuru, Aisin AW Co Ltd*
2:00 p.m.	***2017-01-1116***	***Application of Large Eddy Simulation to a Torque Converter to Predict its Fluid Performance*** *Tomohiro Tasaka, Exedy Corporation; Nobuyuki Oshima, Hokkaido University; Shinji Fujimoto, Yuya Kishi, Exedy Corporation*
2:30 p.m.	***2017-01-1115***	***Numerical Investigation of Flow Induced Excitations in a Torque Converter*** *Nandan A. Sawkar, Prashant Modi, Michael Fingerman, FCA US LLC*
3:00 p.m.	***2017-01-1117***	***Ratcheting One-Way Clutches in Torque Converters*** *Norman J. Bird, Alex Vinogradov, Ford Motor Company*

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Multi-Dimensional Engine Modeling (Part 5 of 6)

Session Code: ***PFL120***

Room 258 ***Session Time:*** ***8:00 a.m.***

The session covers advances in the development and application of models and tools involved in multi-dimensional engine modeling: advances in chemical kinetics, combustion and spray modeling, turbulence, heat transfer, mesh generation, and approaches targeting improved computational efficiency. Papers employing multi-dimensional modeling to gain a deeper understanding of processes related to turbulent transport, transient phenomena, and chemically reacting, two-phase flows are also encouraged.

Organizers - *Hardo Barths, General Motors; Gianluca D'Errico, Politecnico di Milano; Stefano Fontanesi, Universita degli Studi di Modena; Daniel C. Haworth, Penn State Univ-University Park*

Chairpersons - *Yuri M. Wright, ETH Zurich*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0553***	***Modeling Ignition and Premixed Combustion Including Flame Stretch Effects*** *Lorenzo Sforza, Tommaso Lucchini, Angelo Onorati, Politecnico di Milano; Xiucheng Zhu, Seong-Young Lee, Michigan Technological University*
8:30 a.m.	***2017-01-0557***	***CFD Modeling and Experimental Analysis of a Homogeneously Charged Turbulent Jet Ignition System in a Rapid Compression Machine*** *Masumeh Gholamisheeri, Bryce Thelen, Elisa Toulson, Michigan State University*
9:00 a.m.	***2017-01-0559***	***Multidimensional Modeling of Injection and Combustion Phenomena in a Diesel Ignited Gas Engine*** *Lucas Eder, Constantin Kiesling, LEC GmbH; Peter Priesching, AVL; Gerhard Pirker, LEC GmbH; Andreas Wimmer, Graz University of Technology*
9:30 a.m.	***2017-01-0569***	***Critical Aspects on the Use of Thermal Wall Functions in CFD In-Cylinder Simulations of Spark-Ignition Engines*** *Fabio Berni, Universita' di Modena e Reggio Emilia; Stefano Fontanesi, Universita degli Studi di Modena; Giuseppe Cicalese, Alessandro D'Adamo, Universita' di Modena e Reggio Emilia*

10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0567***	***Evaluating Different Measures to Improve the Numerical Simulation of the Mixture Formation in a Spark-Ignition CNG-DI-Engine*** *Andrea Twellmeyer, Fabian Kopple, Robert Bosch GmbH; Bernhard Weigand, Universitat Stuttgart*
11:00 a.m.	***2017-01-0546***	***Numerical Simulation of Gasoline and n-Butanol Combustion in an Optically Accessible Research Engine*** *Sebastiano Breda, Alessandro D'Adamo, Stefano Fontanesi, Fabrizio D'Orrico, Universita degli Studi di Modena; Adrian Irimescu, Simona Merola, Istituto Motori CNR; Nicola Giovannoni, Universita degli Studi di Modena*
11:30 a.m.	***2017-01-0581***	***Distillation-based Droplet Modeling of Non-Ideal Oxygenated Gasoline Blends: Investigating the Role of Droplet Evaporation on PM Emissions*** *Stephen C. Burke, Colorado State University; Matthew Ratcliff, Robert McCormick, National Renewable Energy Laboratory; Robert Rhoads, University of Colorado - Colorado Springs; Bret Windom, Colorado State University*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00578, and also individually. T purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Multi-Dimensional Engine Modeling (Part 6 of 6)

Session Code: ***PFL120***

Room 258 ***Session Time:*** ***1:30 p.m.***

The session covers advances in the development and application of models and tools involved in multi-dimensional engine modeling: advances in chemical kinetics, combustion and spray modeling, turbulence, heat transfer, mesh generation, and approaches targeting improved computational efficiency. Papers employing multi-dimensional modeling to gain a deeper understanding of processes related to turbulent transport, transient phenomena, and chemically reacting, two-phase flows are also encouraged.

Organizers - *Hardo Barths, General Motors; Gianluca D'Errico, Politecnico di Milano; Stefano Fontanesi, Universita degli Studi di Modena; Daniel C. Haworth, Penn State Univ-University Park*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0572***	***An Efficient and Unified Combustion Model for CFD of SI and CI Engine Operation*** *Mianzhi Wang, Suya Gao, University of Illinois at Urbana-Champaign; Chia-Fon Lee, University of Illinois; Beijing Institute of Technology*
2:30 p.m.	***2017-01-0563***	***Simulations of Spark-Plug Transient Plasma Breakdown in Automotive Internal Combustion Engines*** *Anand Karpatne, Douglas P. Breden, Esgee Technologies; Laxminarayan Raja, University of Texas at Austin*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Powertrain NVH (Part 2 of 2)

Session Code: ***PFL550***

Room 259 ***Session Time: 8:00 a.m.***

This session sets out to reflect the recent advances on the research, development and practices of Powertrain NVH treatment. The technical papers are of interest to powertrain system designers, testing specialists, NVH experts, and other individuals who evaluate and develop technologies to control powertrain NVH. The coverage includes: engine, engine subsystem and components noise and vibration; powertrain systems noise measurement and instrumentation; powertrain systems noise analysis.

Organizers - *Mikhail A. Ejakov, Ford Motor Company; Leonid Tartakovsky, Technion Israel Inst. of Technology; Gang Sheng Chen Sheng, Marshall University*

Time	Paper No.	Title
8:00 a.m.	2017-01-1055	**Analytical Study on Electric Motor Whine Radiated from Hybrid Vehicle Transmission** *Baolin Yu, Zhi Fu, T. Bin Juang, Ford Motor Company*
8:30 a.m.	2017-01-1053	**Application of Model-Based Development to Engine Restart Vibration After Idling Stop** *Satoshi Watanabe, Yuji Miyata, Honda R&D Co., Ltd.; Yosuke Ogata, Siemens K.K.; Vincent Ivosic, Siemens Industry Software S.A.S.*
9:00 a.m.	ORAL ONLY	**Improvement on Imbalance Assessment For Automatic Transmissions** *Scott Yu, Ford Motor Company*
9:30 a.m.	2017-01-1061	**Sound Quality Evaluation of Centralized Drive PMSM Based on Grade Scoring Method** *Jiachen Zhai, Tongji University; Ma Conggan*
10:00 a.m.		**BREAK**
10:30 a.m.	2017-01-1052	**Direct Injection Design Principles for NVH** *Paul Zeng, Vincent Solferino, Mark Stickler, Ford Motor Company*
11:00 a.m.	2017-01-1057	**Valvetrain Ticking Noise Analysis** *Paul Zeng, Debabrata Paul, Vincent Solferino, Mark Stickler, Ford Motor Company*
11:30 a.m.	2017-01-1054	**Multibody Dynamics Cosimulation for Vehicle NVH Response Predictions** *Imad M. Khan, Makrand Datar, Wulong Sun, Georg Festag, T Bin Juang, Natalie Remisoski, Ford Motor Company*
12:00 p.m.	2017-01-1064	**Engine Inertia and Combustion Loads Parameters Effect on Vehicle Interior Noise** *Mustafa YÄ±ldÄ±rÄ±m, Istanbul Technical University*

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Advanced Hybrid and Electric Vehicle Powertrains (Part 5 of 6)

Session Code: ***PFL710***

Room 260 Portside Ballroom ***Session Time: 8:00 a.m.***

This session covers new production and near-production hybrid powertrains, hybrid architecture, and testing.

Organizers - *Michael Duoba, Argonne National Laboratory; Matthew Fleming, Ford Motor Co., Ltd.; Andrej Ivanco, Clemson-ICAR; Wiley R. McCoy, McLaren Performance Technologies; Constantine N. Raptis, GM Powertrain*

Time	Paper No.	Title

8:00 a.m.	***ORAL ONLY***	***Battery Health Management Based on the Real-world Driving Data Throughout the Vehicle Lifespan*** *Zifan Liu, Andrej Ivanco, Simona Onori, Zoran Filipi, Clemson-ICAR*
8:30 a.m.	***2017-01-1169***	***A Theo-Practical Methodology for Series Hybrid Vehicles Evaluation and Development*** *Ahmed M. Ali, Alhossein Mostafa Sharaf, Hesham Kamel, Shawky Hegazy, Egyptian Armed Forces*
9:00 a.m.	***2017-01-1172***	***Conceptual Design and Evaluation of a Hybrid Transmission with Power-Split, Series, and Two Parallel Configurations*** *Yan-Song Chen, Joshua Chang, I-Ming Chen, Ming-Yen Chen, Tyng Liu, National Taiwan University*
9:30 a.m.	***2017-01-1174***	***Long Term Impact of Vehicle Electrification on Vehicle Weight and Cost Breakdown*** *Vincent Freyermuth, Aymeric Rousseau, Argonne National Laboratory*
10:00 a.m.		***BREAK***
11:00 a.m.	***~~2017-01-1166~~*** ***ORAL ONLY***	***CO2 Reduction Through Low Cost Electrification of the Diesel Powertrain at 48V*** *Gareth Milton, Ricardo UK Ltd; Paul Bloore, Controlled Power Technologies Ltd.; Khizer Tufail, Barnaby Paul Coates, Ford Motor Company; Ian Newbigging, Faurecia Exhaust Control Technologies; Allan Cooper, European Advanced Lead Acid Battery Consortium; Paul Shayler, University of Nottingham*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Advanced Hybrid and Electric Vehicle Powertrains (Part 6 of 6)

Session Code: ***PFL710***

Room 260 Portside Ballroom ***Session Time:*** ***1:30 p.m.***

This session covers new production and near-production hybrid powertrains, hybrid architecture, and testing.

Organizers - *Michael Duoba, Argonne National Laboratory; Matthew Fleming, Ford Motor Co., Ltd.; Andrej Ivanco, Clemson-ICAR; Wiley R. McCoy, McLaren Performance Technologies; Constantine N. Raptis, GM Powertrain*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***SAE J2954 Recommended Practice for Wireless Power Transfer, the next phase for Standardizing Wireless Charging.*** *Jesse Schneider, BMW*
1:30 p.m.	***2017-01-1176***	***Manage and Optimize Power System to Maximize Steering Assist and Stop-Start Availability*** *Hafiz S. Khafagy, Ford Motor Company*
2:00 p.m.	***2017-01-1178***	***Highlighting the Differential Benefit in Greenhouse Gas Reduction via Adoption of Plugin Hybrid Vehicles for Different Patterns of Real Driving*** *Ken Laberteaux, Karim Hamza, Toyota Motor Corporation*
2:30 p.m.	***2017-01-1177***	***Equivalent Consumption Minimization Strategy for Mild Hybrid Electric Vehicles with a Belt Driven Motor*** *Youngho Jun, Byung Chun Jeon, WoongRo Youn, Hyundai Autron*

3:00 p.m.	***2017-01-1149***	***Regenerative Braking Control Development for P2 Parallel Hybrid Electric Vehicles*** *Yanan Zhao, Ming Kuang, Bernard Nefcy, Dan Colvin, Stuart Ford, Zheng Liu, Ford Motor Company*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Fatigue Modeling / Testing & CAE Durability Analysis (Part 5 of 6)

Session Code: ***M200***

Room 310 B ***Session Time:*** ***8:00 a.m.***

Topics discussed in this session focus on innovative and improved fatigue methodologies and problem-solving techniques on automotive components, assemblies, and vehicles based on material characterization, testing and CAE (Computer Aided Engineering) analysis.

Organizers - *Abolhassan Khosrovaneh, General Motors LLC; Guofei Chen, United States Steel Corp.; Carlos Carvalho Engler-Pinto, Ford Motor Co., Ltd.; Mingchao Guo, FCA US LLC; Zhigang Wei, Tenneco Inc.*

Chairpersons - *Zhigang Wei, Tenneco Inc.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0360***	***Vibration Fatigue for Chassis-Mounted, Cantilevered Components*** *Guangtian Gavin Song, Joe Peters, Steven Hopson, Adrian Jordan, Ford Motor Company*
8:30 a.m.	***2017-01-0352***	***Consideration of Temperature Effects in Thermal-Fatigue Performance Assessment of Components with Stress Raisers*** *Zhigang Wei, Limin Luo, Richard Voltenburg, Mark Seitz, Jason Hamilton, Robert Rebandt, Tenneco Inc.*
9:00 a.m.	***2017-01-0354***	***Development of Probabilistic Fatigue Life Distribution Functions with Lower and Upper Bounds*** *Zhigang Wei, Ranjith Nayaki, Raghuram Mandapati, Jason Hamilton, Tenneco Inc.*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0332***	***Frequency Effects on High-Density Polyethylene Failure under Cyclic Loading*** *Zhengpan Qi, Chongqing University; Li Lu, Linh Doan, Bhavani Thota, Danielle Zeng, Xuming Su, Ford Motor Company*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 6

Fatigue Modeling / Testing & CAE Durability Analysis (Part 6 of 6)

Session Code: ***M200***

Room 310 B ***Session Time:*** ***1:00 p.m.***

Topics discussed in this session focus on innovative and improved fatigue methodologies and problem-solving techniques on automotive components, assemblies, and vehicles based on material characterization, testing and CAE (Computer Aided Engineering) analysis.

Organizers - *Abolhassan Khosrovaneh, General Motors LLC; Guofei Chen, United States Steel Corp.; Carlos Carvalho Engler-Pinto, Ford Motor Co., Ltd.; Mingchao Guo, FCA US LLC; Zhigang Wei, Tenneco Inc.*

Chairpersons - *Carlos Carvalho Engler-Pinto, Ford Motor Company*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-0330***	***Deriving a Continuous Fatigue Life Curve from LCF to VHCF*** *Rainer Wagener, Fraunhofer LBF; Tobias Melz, Fraunhofer Institute LBF*
1:30 p.m.	***2017-01-0353***	***Evaluation of the Influence of MnS in Forged Steel 38MnVS6 on Fatigue Life*** *Matilde Scurria, Sinem Emre, Technische UniversitÃ¤t Darmstadt, SAM; Benjamin MÃ¶ller, Rainer Wagener, Tobias Melz, Fraunhofer LBF*
2:00 p.m.	***2017-01-0348***	***Methodology to Study the Effect of Variation of Suspension Characteristics on Body Durability*** *Mani Shankar, I V N Sri Harsha, K V Sunil, Ramsai Ramachandran, Maruti Suzuki India Ltd*
2:30 p.m.	***2017-01-0356***	***Fatigue Assessment with Special Respect to Size Effects and Material Behavior within Local Strain-Based Approaches*** *Matthias Hell, Rainer Wagener, Heinz Kaufmann, Fraunhofer LBF; Tobias Melz, Fraunhofer Institute LBF*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 6

Reliability and Robust Design in Automotive Engineering: Model Validation and Verification

Session Code: ***IDM106***

Room 311 A ***Session Time:*** ***8:00 a.m.***

Model Validation and Verification invite presentations that deal with the theoretical and/or applied aspects of one or more of the following representative topics: model development, model correlation/calibration, model verification, model validation, uncertainty quantification, uncertainty propagation, validation metrics, predictive capability assessment, etc.

Organizers - *Zhimin Xi, University of Michigan - Dearborn; Zhenfei Zhan, Chongqing University*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0220***	***Trivial Principal Component Analysis (TPCA): An Improved Modeling Approach*** *Balakrishna Chinta, General Motors Company*
8:30 a.m.	***2017-01-0219***	***Engine in the Loop: Closed Loop Test Bench Control with Real-Time Simulation*** *Serge Klein, Rene Savelsberg, Feihong Xia, Daniel Guse, Jakob Andert, RWTH Aachen University; Torsten Blochwitz, Claudia Bellanger, ESI ITI GmbH; Stefan Walter, Steffen Beringer, Janek Jochheim, Nicolas Amringer, dSPACE GmbH*
9:00 a.m.	***2017-01-0222***	***Assessing Design Impact Using a Multi-Accurate Measurement Model*** *Amanda Zagorianakos, Dan Zwillinger, Autoliv*
9:30 a.m.		***BREAK***
10:00 a.m.	***ORAL ONLY***	***Model Uncertainty Approximation Using a Copula-based Approach for Reliability Based Design Optimization*** *Zhimin Xi, University of Tennessee - Knoxville*

10:30 a.m.	***2017-01-0218***	***Multi-Axis Simulation Test for Two-Wheeler Carrier Structure of a Commercial Vehicle Using Accelerated Road Load Data*** *N. Obuli Karthikeyan, L. Karthik, R. Dinesh Kumar, V. Srinivasa Chandra, Ashok Leyland Ltd.*
11:00 a.m.	***2017-01-0221***	***A Comprehensive Validation Method with Surface-Surface Comparison for Vehicle Safety Applications*** *Junqi Yang, Zhenfei Zhan, Ling Zheng, Gang Guo, Chongqing University; Changsheng Wang, Tongji University*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Thursday, April 6

Modeling and Simulation of Military Ground Vehicles (Part 3 of 4)

Session Code: ***IDM201***

Room 311 B ***Session Time:*** ***8:00 a.m.***

The complexity and cost of military ground vehicles render them ideal candidates for a system-level modeling and simulation environment. This session will serve as a technical forum to address the practical challenges, current gaps, and emerging technologies related to modeling and simulation of military ground vehicles.

Organizers - *Denise M. Rizzo, Matthew Castanier, US Army TARDEC*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Can We Use Validated Simulation Model Instead of Large Number of Physical Tests for Confidence-Based Reliability Assessment?*** *Kyung K. Choi, Univ. of Iowa; Hyunkyoo Cho, Min-yeong Moon, The University of Iowa; Nicholas Gaul, RAMDO Solutions, LLC; David Lamb, US Army TARDEC; David Gorsich, US Army RDECOM*
8:30 a.m.	***2017-01-0258***	***Durability Test Time Reduction Methods*** *Mark Brudnak, James Walsh, Igor Baseski, Bryan LaRose, U.S. Army TARDEC*
9:00 a.m.	***2017-01-0264***	***Faster Method of Simulating Military Vehicles Exposed to Fragmenting Underbody IED Threats*** *Venkatesh Babu, US Army; Ravi Thyagarajan, US Army TARDEC; Jaisankar Ramalingam, TARDEC*
9:30 a.m.		***BREAK***
10:00 a.m.	***ORAL ONLY***	***Machine Learning for Vehicle Mobility Prediction*** *Mohil D. Patel, University of Illinois at Chicago; Paramsothy Jayakumar, US Army TARDEC; Dave Mechergui, TARDEC*
10:30 a.m.	***2017-01-0273***	***Simulating the Mobility of Wheeled Ground Vehicles with Mercury*** *Chris Goodin, US Army ERDC; Jeremy Mange, Sara Pace, Thomas Skorupa, Daniel Kedziorek, US Army TARDEC; Jody Priddy, Larry Lynch, US Army ERDC*
11:00 a.m.	***2017-01-0267***	***Near Automatic Translation of Autonomie-Based Power Train Architectures for Multi-Physics Simulations Using High Performance Computing*** *Tomasz Haupt, Gregory Henley, Angela Card, Michael S. Mazzola, Matthew Doude, Mississippi State Univ; Scott Shurin, US Army TARDEC; Christopher Goodin, US Army ERDC*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Thursday, April 6

Modeling and Simulation of Military Ground Vehicles (Part 4 of 4)

Session Code: ***IDM201***

Room 311 B ***Session Time:*** ***1:00 p.m.***

The complexity and cost of military ground vehicles render them ideal candidates for a system-level modeling and simulation environment. This session will serve as a technical forum to address the practical challenges, current gaps, and emerging technologies related to modeling and simulation of military ground vehicles.

Organizers - *Denise M. Rizzo, Matthew Castanier, US Army TARDEC*

Time	Paper No.	Title
1:00 p.m.	***2017-01-0261***	***Tactical Behavior Modeling for Ground Vehicles*** *Randolph Jones, Robert Marinier III, Frank Koss, Robert Bechtel, John A. Sauter, Soar Technology Inc.*
1:30 p.m.	***2017-01-0269***	***The Relative Importance of Fuel Oxidation Chemistry and Physical Properties to Spray Ignition*** *Doohyun Kim, Jason Martz, Angela Violi, University of Michigan-Ann Arbor*
2:00 p.m.	***2017-01-0262***	***<bold xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:mml="http://www.w3.org/1998/Math/MathML">Experimental Validation of Jet Fuel Surrogates in an Optical Engine</bold>*** *Taewon Kim, Xi Luo, Mustafa Al-Sadoon, Ming-Chia Lai, Marcis Jansons, Wayne State University; Doohyun Kim, Jason Martz, Angela Violi, University of Michigan-Ann Arbor; Eric Gingrich, US Army TARDEC*
2:30 p.m.	***2017-01-0263***	***Development of a Surrogate for SASOL IPK and Its Validation in Ignition Quality Tester*** *Krishnaraj Udayachalam, Manan Trivedi, Ziliang Zheng, Amit Shrestha, Naeim Henein, Wayne State University*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Thursday, April 6

Body Engineering and Design (Part 1 of 2)

Session Code: ***SS100***

Room 312 A ***Session Time:*** ***8:00 a.m.***

BE & D cover several important areas that are related to vehicle body, including its components such as instrument panel, steering column and wheel, seats, hood, decklid, transmission cross-member, hard mounted chassis, CRFM, etc. Topics included are: Novel concepts, Analysis, Design, Testing, Predictions of strength, stiffness, and fatigue life, welding methods, vehicle body quality, durability, reliability, safety, ride & handling, NVH, aerodynamics, mass reduction, as well as fuel economy.

Organizers - *Mallikarjuna Bennur, General Motors LLC; Raghu Echempati, Kettering Univ.; Ramakrishna Koganti, Ramk Inc.; Joseph E. Poley; Vesna Savic, General Motors LLC; Saeed Siavoshani, Siemens PLM Software*

Time	Paper No.	Title
8:00 a.m.	***2017-01-1297***	***Harmonizing and Rationalizing Lightweighting within Fuel Efficiency Regulations Across NA, EU and China*** *Robert Peckham, Sumit Basu, Marcelo Ribeiro, Sandra Walker, General Motors LLC*
8:30 a.m.	***2017-01-1306***	***Practical Design Considerations for Lightweight Windshield Applications*** *Michael Ulizio, DeWitt Lampman, Mukesh Rustagi, Jason Skeen, Pittsburgh Glass Works LLC; Chester Walawender, Ford Motor Company*

9:00 a.m.	***2017-01-1300***	***Fan Shroud Design for Low Speed Damageability*** *Raj Jayachandran, Bhimaraddi Alavandi, Matt Niesluchowski, Erika Low, Yafang Miao, Yi Zhang, Ford Motor Company*

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 6

Body Engineering and Design (Part 2 of 2)

Session Code: ***SS100***

Room 312 A ***Session Time:*** ***1:00 p.m.***

BE & D cover several important areas that are related to vehicle body, including its components such as instrument panel, steering column and wheel, seats, hood, decklid, transmission cross-member, hard mounted chassis, CRFM, etc. Topics included are: Novel concepts, Analysis, Design, Testing, Predictions of strength, stiffness, and fatigue life, welding methods, vehicle body quality, durability, reliability, safety, ride & handling, NVH, aerodynamics, mass reduction, as well as fuel economy.

Organizers - *Mallikarjuna Bennur, General Motors LLC; Raghu Echempati, Kettering Univ.; Ramakrishna Koganti, Ramk Inc.; Joseph E. Poley; Vesna Savic, General Motors LLC; Saeed Siavoshani, Siemens PLM Software*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1305***	***Mechanical Design, Prototyping, and Validation of A Martian Robot Mining System*** *Yucheng Liu, Jeremy Batte, Zachary Collins, Jennifer Bateman, John Atkins, Madelyn Davis, David Salley, Cindy L. Bethel, John Ball, Christopher Archibald, Mississippi State University*
1:30 p.m.	***2017-01-1303***	***Trunk Lid Torsion Bar Design Based on Reverse Engineering Method*** *Nobuhisa Yasuda, Shinichi Nishizawa, Maiko Ikeda, Tadashi Sakai, NHK International Corporation*
2:00 p.m.	***2017-01-1304***	***Use of Plastic Trim Fasteners for Automotive Trimming Applications*** *Alejandro Rosas Vazquez, Fernando Paisano, Diego Santillan Gutierrez, Ford Motor Company*
2:30 p.m.	***2017-01-1302***	***Study of Optimizing Sliding Door Efforts and Package Layout*** *Hyung In Yun, Jae Kyu Lee, Jae Hong Choi, MyoungKwon Je, Junhyuk Kim, Hyundai Motor Company*
3:00 p.m.	***2017-01-1343***	***A Study on Various Structural Concepts of Automotive Door Trim*** *Manoranjan Sahoo, FCA Engineering India Pvt. Ltd.; Ruan (Jason) Liangfei, FCA Asia Pacific Investment Co. Ltd; Hari Nadh Gudula, Raghuraman Taruvai, Sathish Kumar S, FCA Engineering India Pvt. Ltd.*
3:30 p.m.	***2017-01-1298***	***Design of Front Structure of Vehicle for Pedestrian Headform Protection*** *Kamlesh Yadav, Maruti Suzuki India, Ltd.; Abhishek Sinha, Rajdeep Singh Khurana, Maruti Suzuki India Ltd*

Planned by Body Engineering Committee / Automobile Body, Chassis, Safety, and Structures Activity

Thursday, April 6

Integrated Computational Materials Engineering (ICME) (Part 2 of 3)

Session Code: ***IDM109***

Room 313 A ***Session Time:*** ***8:00 a.m.***

This is a special session for the DOE-funded project: ICME of carbon fiber composites for vehicle lightweighting.

Organizers - *Hongyi Xu, Yang Li, Ford Motor Company; Qigui Wang, General Motors LLC; Mei Li, Ford Motor Company; Alan Luo, Ohio State University*

Time	Paper No.	Title
8:00 a.m.	***ORAL ONLY***	***Predicting the Macroscopic Fracture Energy of Epoxy Resins from Atomistic Molecular Simulations*** *Zhaoxu Meng, Northwestern University*
8:30 a.m.	***ORAL ONLY***	***Simulation and experimental analysis of the preforming process of the woven composite prepreg*** *Huaqing Ren, Weizhao Zhang, Yanchao Wang, Northwestern Univ; Danielle Zeng, Ford Research and Innovation Center; Xuming Su, Ford Motor Co Ltd; Wei Chen, Wing Kam Liu, Jian Cao, Northwestern Univ*
9:00 a.m.	***2017-01-0228***	***Modeling and Simulation of Compression Molding Process for Sheet Molding Compound (SMC) of Chopped Carbon Fiber Composites*** *Yang Li, Ford Motor Company; Zhangxing Chen, Chongqing University; Hongyi Xu, Jeffrey Dahl, Danielle Zeng, Ford Motor Company; Mansour Mirdamadi, Dow Chemical Company; Xuming Su, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0224***	***A Comparative Study of Two RVE Modelling Methods for Chopped Carbon Fiber SMC*** *Zhangxing Chen, Chongqing University; Yi Li, Shanghai Jiao Tong University; Yimin Shao, Chongqing University; Tianyu Huang, Northwestern University; Hongyi Xu, Yang Li, Ford Motor Company; Wei Chen, Northwestern University; Danielle Zeng, Katherine Avery, Ford Motor Company; HongTae Kang, University of Michigan; Xuming Su, Ford Motor Company*
10:30 a.m.	***ORAL ONLY***	***Microstructure Reconstruction of Sheet Molding Composite Using a Random Chips Packing Algorithm*** *Tianyu Huang, Northwestern University; Hongyi Xu, Ford Motor Company; Wei Chen, Northwestern University*
11:00 a.m.	***ORAL ONLY***	***Uncertainty Quantification in Multiscale Simulation of Carbon Fiber Reinforced Polymers using Additive Gaussian Processes for Top-down Sampling*** *Ramin Bostanabad, Biao Liang, Jiaying Gao, Zeliang Liu, Puikei Cheng, Weizhao Zhang, Jian Cao, Wing Kam Liu, Wei Chen, Northwestern University*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Thursday, April 6

Integrated Computational Materials Engineering (ICME) (Part 3 of 3)

Session Code: ***IDM109***

Room 313 A ***Session Time:*** ***1:00 p.m.***

This is a special session for the DOE-funded project: ICME of carbon fiber composites for vehicle lightweighting.

Organizers - *Hongyi Xu, Yang Li, Ford Motor Company; Qigui Wang, General Motors LLC; Mei Li, Ford Motor Company; Alan Luo, Ohio State University*

Time	Paper No.	Title

1:00 p.m.	***2017-01-0230***	***High Strain Rate Mechanical Characterization of Carbon Fiber Reinforced Polymer Composites Using Digital Image Correlations***
		Louise A. Powell, William E. Luecke, Matthias Merzkirch, National Institute of Standards and Technology; Katherine Avery, Ford Motor Company; Tim Foecke, National Institute of Standards and Technology
1:30 p.m.	***2017-01-0229***	***Process Integration and Optimization of ICME Carbon Fiber Composites for Vehicle Lightweighting: A Preliminary Development***
		Hongyi Xu, Yang Li, Danielle Zeng, Ford Motor Company
2:00 p.m.	***2017-01-0231***	***Meso-modeling of Carbon Fiber Composite for Crash Safety Analysis***
		Shih-Po Lin, Yijung Chen, Danielle Zeng, Xuming Su, Ford Motor Company
2:30 p.m.	***2017-01-0223***	***Study on Fatigue Behaviors of Porous T300/924 Carbon Fiber Reinforced Polymer Unidirectional Laminates***
		Haolong Liu, Weidong Wen, Nanjing University of Aeronautics and Astronautics; Xuming Su, Carlos Engler-Pinto, Ford Motor Company; HongTae Kang, University of Michigan
3:00 p.m.	***ORAL ONLY***	***Modeling inter-laminar fracture toughness tests of unidirectional carbon fiber composite***
		Qingping Sun, Nanjing Univ. of Aero. & Astro.; Xuming Su, Ford Motor Co Ltd; Danielle Zeng, Ford Research and Innovation Center

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Thursday, April 6

Robotics and Factory Automation (Part 1 of 2)

Session Code: ***IDM303***

Room 313 B ***Session Time:*** ***8:00 a.m.***

Manufacturing success is dependent on the maximum utilization of all available resources, through rethinking production methodology, empowering human creativity and intelligence, utilizing robotics (traditional fixed, mobile, and cobotic), capturing and capitalizing on available information for throughout the automotive product life cycle. This session will explore robotics and factory automation technologies and processes as they relate to the ever-changing manufacturing floor.

Organizers - *Monika Minarcin, Omron; Ana M. Djuric, Wayne State Univ.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0290***	***IIoT-Enabled Production System for Composite Intensive Vehicle Manufacturing***
		Veera Aditya Yerra, CU-ICAR Clemson University; Srikanth Pilla, Clemson University
8:30 a.m.	***2017-01-0293***	***Intelligent Robotics Safeguarding***
		Tina Hull, Omron Corp.
9:00 a.m.	***ORAL ONLY***	***Location Context for IIoT Platforms (Ubisense)***
		Adrian Jennings, Ubisense Inc.
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0294***	***How ready are we to implement a Smart Factory?***
	ORAL ONLY	*Monika Minarcin, Omron Corp.*

10:30 a.m.	***Panel***	***Technical Expert Panel Discussion: What Is the Future of Automation In Manufacturing?*** *Advances in automotive technologies coupled with a changing automotive business model are profoundly changing the players, the marketplace, and the way vehicles and their components are designed. But what does this mean for the factory? What will the factory of the future be like with respect to its structure, technologies, and processes? What will be required in terms to make it a reality? How do we get to "the factory of the future"? Join our panel discussion of industry and technical experts as we discuss the pressures and changes to the factory environment.* ***Moderators -*** *Monika Minarcin, Omron Corp.*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Thursday, April 6

Technical Expert Panel Discussion: What Is the Future of Automation In Manufacturing?

Session Code: ***IDM303***

Room 313 B ***Session Time:*** ***10:30 a.m.***

Advances in automotive technologies coupled with a changing automotive business model are profoundly changing the players, the marketplace, and the way vehicles and their components are designed. But what does this mean for the factory? What will the factory of the future be like with respect to its structure, technologies, and processes? What will be required in terms to make it a reality? How do we get to "the factory of the future"? Join our panel discussion of industry and technical experts as we discuss the pressures and changes to the factory environment.

Moderators - *Monika Minarcin, Omron Corp.*

Panelists - *Tim A. Cavanaugh, SAE International; Adrian Jennings, Ubisense Inc.; Curtis S. Wilson, Delta Tau Data Systems Inc. of California;*

Thursday, April 6

Robotics and Factory Automation (Part 2 of 2)

Session Code: ***IDM303***

Room 313 B ***Session Time:*** ***1:00 p.m.***

Manufacturing success is dependent on the maximum utilization of all available resources, through rethinking production methodology, empowering human creativity and intelligence, utilizing robotics (traditional fixed, mobile, and cobotic), capturing and capitalizing on available information for throughout the automotive product life cycle. This session will explore robotics and factory automation technologies and processes as they relate to the ever-changing manufacturing floor.

Organizers - *Monika Minarcin, Omron Corp.; Ana M. Djuric, Wayne State Univ.*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-0288***	***Iterative Learning Algorithm Design for Variable Admittance Control Tuning of A Robotic Lift Assistant System*** *Hai Wu, Meng-Feng Li, General Motors LLC*
1:30 p.m.	***ORAL ONLY***	***CNC Machining in the 21st Century*** *Curtis S. Wilson, Delta Tau Data Systems Inc. of California*
2:30 p.m.	***ORAL ONLY***	***Manufacturing Electronics for the Future Vehicle*** *David Lawson, Omron Automotive Electronics Inc.*

Planned by Integrated Design and Manufacturing Activity / EMB Land and Sea Group

Thursday, April 6

Cybersecurity for Cyber-Physical Vehicle Systems (Part 2 of 3)

Session Code: ***AE202***

Room 320 ***Session Time:*** ***8:00 a.m.***

This session focuses on cybersecurity for cyber-physical vehicle systems. Topics include: design, development and implementation of security-critical cyber-physical vehicle systems, cybersecurity design, development, and implementation strategies, analysis methodologies, process and life-cycle management, comparisons of system safety and cybersecurity, etc. Application areas include: security-critical automotive systems as well as other security-critical ground vehicle and aviation systems.

Organizers - *Amit Choudhury, TRW Automotive; Mohammad Naserian, General Motors LLC; Barbara J. Czerny, Brian T. Murray, ZF - TRW; David Ward, Horiba Mira, Ltd.*

Time	Paper No.	Title
8:00 a.m.	***ORAL ONLY***	***Autonomous Driving as motivation of a Safety & Security regarding automotive development***
		Paul Arndt, Invensity GmbH
8:30 a.m.	***ORAL ONLY***	***Developments in the spoofing of Position, Navigation and Timing Systems***
		Guy Buesnel, Spirent Communications International Inc.
9:00 a.m.	***2017-01-1657***	***Identifying Security Vulnerabilities Early in the ECU Software Development Lifecycle***
		Jesse Edwards, Ameer Kashani, DENSO International America Inc
9:30 a.m.		***BREAK***
10:00 a.m.	***ORAL ONLY***	***CAN Message Authentication: Restrictions, Challenges and Complexity***
		Xin Ye, Ford Motor Company
10:30 a.m.	***2017-01-1658***	***The Study of Secure CAN Communication for Automotive Applications***
		Qingwu Zou, Wai Keung Chan, Kok Cheng Gui, Qi Chen, Klaus Scheibert, Laurent Heidt, Eric Seow, Infineon Technologies
11:00 a.m.	***2017-01-1659***	***Hardware/Software Co-Design of an Automotive Embedded Firewall***
		Mert D. PesÃ©, Karsten Schmidt, Audi Electronics Venture GmbH; Harald Zweck, Infineon Technologies AG

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Thursday, April 6

Cybersecurity for Cyber-Physical Vehicle Systems (Part 3 of 3)

Session Code: ***AE202***

Room 320 ***Session Time:*** ***1:00 p.m.***

This session focuses on cybersecurity for cyber-physical vehicle systems. Topics include: design, development and implementation of security-critical cyber-physical vehicle systems, cybersecurity design, development, and implementation strategies, analysis methodologies, process and life-cycle management, comparisons of system safety and cybersecurity, etc. Application areas include: security-critical automotive systems as well as other security-critical ground vehicle and aviation systems.

Organizers - *Amit Choudhury, TRW Automotive; Mohammad Naserian, General Motors LLC; Barbara J. Czerny, Brian T. Murray, ZF - TRW; David Ward, Horiba Mira, Ltd.*

Time	Paper No.	Title

1:00 p.m.	***2017-01-1660***	***Secure and Privacy-Preserving Data Collection Mechanisms for Connected Vehicles*** *Huaxin Li, Di Ma, Brahim Medjahed, Qianyi Wang, University of Michigan-Dearborn; Yu Seung Kim, Pramita Mitra, Ford Motor Company*
1:30 p.m.	***2017-01-1662***	***A Balanced Approach for Securing the OBD-II Port*** *Tom R. Markham, Alex Chernoguzov, Honeywell*
2:00 p.m.	***2017-01-1653***	***Autonomous Key Management (AKM) Security Architecture for Vehicle and IoT Applications*** *Jon Barton Shields, JÃ¶rg Huser, David Gell, Olympus Sky Technologies, S.A.*
2:30 p.m.	***2017-01-1654***	***Exploiting Consistency Among Heterogeneous Sensors for Vehicle Anomaly Detection*** *Arun Ganesan, University of Michigan; Jayanthi Rao, Ford Motor Company; Kang Shin, University of Michigan*
3:00 p.m.	***2017-01-1656***	***Secure Boot Implementation for Hard Real-Time Powertrain System*** *Daehyun Kim, Eunho Shin, Hyundai Autron; Jin Seo Park, KyungSu LEE, Kok Cheng Gui, Klaus Scheibert, Infineon Technologies*
3:30 p.m.	***ORAL ONLY***	***Building a Cybersecurity Testing Lab within a Tier 1 Supplier*** *Justin Montalbano, Delphi Electronics & Safety*
4:00 p.m.	***2017-01-1655***	***Cybersecurity Testing and Validation*** *Paul Wooderson, David Ward, HORIBA MIRA Ltd*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Thursday, April 6

LCA and Automotive Sustainability: Materials Production; Manufacturing; Use; End-of-Life (Part 2 of 2)

Session Code: ***SDP102***

Room 331 A ***Session Time:*** ***8:30 a.m.***

This session covers topics on life cycle assessment and automotive sustainability with respect to materials tools/technologies and/or processes in any phase of the automotive life cycleâ€"materials production, manufacturing, Use, and End-of-Life.

Organizers - *Susan Sawyer-Beaulieu, Katie Soulliere, Univ. of Windsor*

Time	***Paper No.***	***Title***
8:30 a.m.	***ORAL ONLY***	***Safer and More Environmentally Friendly Method to Transport Lithium Ion Batteries*** *Thomas R. B. Grandjean, Jakobus Groenewald, WMG Innovative Solutions; James Marco, Warwick University*
9:00 a.m.	***ORAL ONLY***	***Policy approaches to optimizing resource recovery associated with end-of-life vehicles*** *Usman Valiante, Cardwell Grove Inc.*
9:30 a.m.	***2017-01-1275***	***The Safe Handling of High Voltage Electric and Hybrid Vehicle Components within the Global Vehicle Recycling Industry*** *David Hobbs, ARA Educational Foundation; Charles Ossenkop, Northwest Auto Parts; Andy Latham, ARA Educational Foundation*

Planned by Sustainable Development Program Committee / Engineering Meetings Board

Thursday, April 6

Vehicle Electrification Strategies for Sustainability

Session Code: ***SDP104***

Room 331 A ***Session Time:*** ***10:30 a.m.***

In this session, speakers will address the issues and design strategies of bringing sustainable EV, PHEV and vehicle electrification technologies to market. The session will also explore new technological advances for battery charging, infrastructure improvements, and repurposing/recycling of battery chemistries. In addition, various initiatives by the EVSE value chain to enhance sustainability will be addressed.

Organizers - *Bhaskaran Gopalakrishnan, West Virginia Univ.; Richard T. Paul, Environmental Management Consultants; Nakia Simon, FCA US LLC*

Time	Paper No.	Title
10:30 a.m.	ORAL ONLY	**Feasibility Analysis for Enhancing Utilization of Electrical Vehicles in West Virginia** *Vivek komarina, West Virginia Univ.; Bhaskaran Gopalakrishnan, West Virginia Univ*
11:00 a.m.	2017-01-1295	**Start/Stop Test Drive Cycle Design and Implementation in Challenging Markets: A Mexico City Case Study** *Andres Toledo, Rodrigo Felix, Ford Motor Company*

Planned by Sustainable Development Program Committee / Engineering Meetings Board

Thursday, April 6

Mobility History

Session Code: ***CONG201***

Room 331 A ***Session Time:*** ***1:30 p.m.***

The Mobility History Committee has as its mission to link the lessons of the past to the present and, with such an understanding, to support the platform for future developments.

Organizers - *James E. Clark; Jeremy Goddard, IDIADA Automotive Technology SA; Michael J. Jones; Keith Vernon Leigh-Monstevens; J. Martin Rowell; Donald L. Wood*

Time	Paper No.	Title
1:30 p.m.	ORAL ONLY	**History of Characterizing Tire Forces and Moments applied to a Vehicle** *Marion G. Pottinger, President, MÆTN Engineering, LLC*
2:05 p.m.	ORAL ONLY	**History of Steam Vehicles** *Jason Torchinsky, Jalopnik*
2:40 p.m.	ORAL ONLY	**Evolution of Brake Dynamometer** *Roy H. Link, Link Engineering Co.*
3:15 p.m.	2017-01-0119	**A Century of Environmental Technologies for Light-Duty Vehicles** *Keith John Holmes, National Academies*

Planned by Mobility History Committee / Engineering Meetings Board

Thursday, April 6

Advances in Coatings (Part 1 of 2)

Session Code: ***M400***

Room 331 B ***Session Time: 8:00 a.m.***

Presentations of this session will address application and research on coatings for exterior body and plastics (including polycarbonate) as well as vehicle interiors and underbody/underhood. Focus will be on the 3-10 year timeframe.

Organizers - *Todd Fitz, Honda R & D Americas Inc.; James Keller, United Paint; Daniel G. Wright, BASF Corp.*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0505***	***Scratch Resistant, Soft Haptic Coatings for Automotive Interiors*** *Aditi Chavannavar, BASF Corp.*
8:30 a.m.	***ORAL ONLY***	***Advanced Polyurethane Lacquers â€“ A Solution to meet High Quality Standards combined with Low Production Costs*** *Markus HellÃ¶rfer, Novem Car Interior Design, Inc.*
9:00 a.m.	***ORAL ONLY***	***Now for Something Completely Different - Invisible Fingerprints*** *Miguel Galvez, NBD Nanotechnologies Inc.*
9:30 a.m.		***BREAK***
10:00 a.m.	***ORAL ONLY***	***The Science of Appearance â¸¢*** *Debbie Linn, PPG Industries*
10:30 a.m.	***ORAL ONLY***	***Thermal Yellowing and Photo-Bleaching of Automotive Topcoats*** *Donald H. Campbell, Colin Wade, Kevin M. Turley, Paragkumar Thanki, BASF Corp.*

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Thursday, April 6

Advances in Coatings (Part 2 of 2)

Session Code: M400

Room 331 B ***Session Time: 1:00 p.m.***

Presentations of this session will address application and research on coatings for exterior body and plastics (including polycarbonate) as well as vehicle interiors and underbody/underhood. Focus will be on the 3-10 year timeframe.

Organizers - *Todd Fitz, Honda R & D Americas Inc.; James Keller, United Paint; Daniel G. Wright, BASF Corp.*

Time	Paper No.	Title
1:00 p.m.	***ORAL ONLY***	***Coating Needs for Autonomous Vehicles*** *Kristen Kruszewski, PPG Industries*
1:30 p.m.	***2017-01-0508***	***Retained Liquid and Bake Drip Simulation Using Geodesic Curves on Triangulations*** *Gabor Kiss, ESS Engineering Software Steyr; Yuya Ando, Cradle North America Inc.; Martin Schifko, ESS Engineering Software Steyr GmbH*
2:00 p.m.	***2017-01-0506***	***General and Galvanic Corrosion Behavior of Aluminized Ultra-High Strength Steel (UHSS) and Magnesium Alloy AZ35 Altered by Plasma Electrolytic Oxidation Coating Processes*** *Xueyuan Nie, Jimi Tjong, University of Windsor*

2:30 p.m.	***2017-01-0507***	***corrender the Zinc-Magnesium-Aluminium (ZM)-HDG-Coated Sheet Steel by voestalpine, is Making its Way into the Automotive World â€“ from Structural Parts to Outer Panels***
		Christian K. Riener, Anna-Elisabeth Raab, Gerald Luckeneder, Martin Rosner, voestalpine Stahl GmbH
3:00 p.m.	***ORAL ONLY***	***Application of Hansen Solubility Parameters in Coating Development***
		Mahshid Niknahad, The Sherwin Williams Company

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Thursday, April 6

Load Simulation and Vehicle Performance: Nonlinear Components/Systems

Session Code: ***M206***

Room 332 ***Session Time:*** ***8:00 a.m.***

The session addresses new theory, formation and modeling of amplitude-, frequency-, and temperature-dependent nonlinear components/systems such as mounts or bushings, shock absorbers, and joint friction/damping; dynamic characterization through lab and field testing; linearization methodology; Model validation, application and sensitivity analysis in vehicle system/subsystem simulations; Nonlinear system identification, modeling, and application in testing accuracy improvement.

Organizers - *Fulun Yang, Tenneco Inc.; Guangqiang Wu, Tongji Univ.; Peijun Xu, Ebco Inc.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0404***	***Basic Characteristics of Adaptive Suspensions of Vehicles with New Principle of Operation***
		Anatoliy Dubrovskiy, Sergei Aliukov, Sergei Dubrovskiy, Alexander Alyukov, South Ural State University
8:30 a.m.	***2017-01-0403***	***Vibro-Impact Analysis of Manual Transmission Gear Rattle and Its Sound Quality Evaluation***
		Guangqiang Wu, Huwei Wu, Tongji University
9:00 a.m.	***2017-01-0405***	***Mount model dependent on amplitude and frequency for automotive powertrain mounting system***
		Tianqi Lv, Xingxing Feng, Huazhong University of Science and Technology; Peijun Xu, Ebco Inc.; Yunqing Zhang, Huazhong University of Science and Technology
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0401***	***Regenerative Brake-by-Wire System Development and Hardware-In-Loop Test for Autonomous Electrified Vehicle***
		Ye Yuan, Junzhi Zhang, Yutong Li, Tsinghua University; Chen Lv, Cranfield University

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 6

Load Simulation and Vehicle Performance: Handling and Dynamics (Part 2 of 2)

Session Code: ***M210***

Room 333 ***Session Time:*** ***8:00 a.m.***

This session focuses on analysis and enhancement of vehicle dynamics performance including handling/ braking/ traction characteristics as well as robustness and active stability under the influence of loading, tire forces and intelligent tire technology for enhancing overall vehicle system dynamics and safety characteristics and robustness. Load variations and other uncertainties, impact of system hybridization and electrification on vehicle dynamics and controls will be discussed.

Organizers - *Bin Li; Michael Royce; Dongpu Cao, Cranfield Univ.; Nenggen Ding; Ken Kang, Honda R & D Americas Inc.*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0427***	***Design of an Adaptive FO-PID Controller for an In-Wheel-Motor Driven Electric Vehicle*** *Yue Shi, Qingwei Liu, Fan Yu, Shanghai Jiao Tong University*
8:30 a.m.	***2017-01-0432***	***Driver Behavior Characteristics Identification Strategy for Adaptive Cruise Control System with Lane Change Assistance*** *Bing Zhu, Zhipeng Liu, Jian Zhao, Weiwen Deng, Jilin University*
9:00 a.m.	***2017-01-0429***	***Virtual Test Design and Automated Analysis of Lane Keeping Assistance Systems in Accordance with Euro NCAP Test Protocols*** *Michael Holland, Cranfield University; Jonathan Gibb, Kacper Bierzanowski, Stuart Rowell, Bo Gao, AVL Powertrain UK; Chen Lv, Dongpu Cao, Cranfield University*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0431***	***On-Board Mass and Center of Gravity of Motor Vehicles Measurement System*** *Xianyao Ping, Wuhan University of Technology; Gangfeng Tan, Wuhan University of Technology & Virginia Tech; Benlong Liu, Shengguang Xiong, Yuyang Cao, Wuhan University of Technology*
10:30 a.m.	***2017-01-0425***	***A Global Optimal Energy Management System for Hybrid Electric off-road Vehicles*** *Hong Wang, Yanjun Huang, University of Waterloo; Chen Lv, Cranfield University; Amir Khajepour, University of Waterloo*
11:00 a.m.	***2017-01-0509***	***Improvement of Lap-Time of a Rear Wheel Drive Electric Racing Vehicle by a Novel Motor Torque Control Strategy*** *Jyotishman Ghosh, Andrea Tonoli, Nicola Amati, Politecnico di Torino*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 6

Welding and Joining and Fastening (Part 2 of 3)

Session Code: ***M216***

Room 334 ***Session Time:*** ***8:00 a.m.***

Presentations in this session include welding (i.e., friction stir, ultrasonic, resistance, arc, laser, etc.) and joining (i.e., brazing, soldering, riveting, bolting, and adhesives) of similar or dissimilar materials (i.e., plastics, composites, aluminum, magnesium, titanium, and conventional and advanced high strength steels). Strength, fracture, and fatigue implications of these methodologies will be discussed.

Organizers - *Pai-Chen Lin, National Chung Cheng Univ.; Jwo Pan, University of Michigan; Tau Tyan, Ford Motor Company*

Time	Paper No.	Title
8:00 a.m.	***2017-01-0474***	***Joining Dissimilar Materials by Magnetic Pulse Welding*** *Chady Khalil, Ecole Centrale de Nantes; Yannick Amosse, Faurecia Automotive Composites; Guillaume Racineux, Ecole Centrale de Nantes*

8:30 a.m.	***ORAL ONLY***	***Vaporizing foil actuator welding as a solution for joining automotive steel and aluminum alloys*** *Anupam Vivek, Ohio State University; Glenn Daehn, Ohio State Univ*
9:00 a.m.	***2017-01-0467***	***Mechanical Performance of Friction Stir Linear Welds of Al to Mg Alloys*** *Wei Yuan, Hitachi America Ltd.; Brian Jordon, University of Alabama; Bita Ghaffari, Ford Motor Company, R&A; Harish Rao, University of Alabama; Shengyi Li, Min Fan, Hitachi America Ltd., R&D Division*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0476***	***Improvement of Crashworthiness in a Hat-Shaped Component Made of 0.44%-Carbon Steel through Arc Spot Welding*** *Seiji Furusako, Masatoshi Tokunaga, Masanori Yasuyama, Nippon Steel & Sumitomo Metal Corp.*
10:30 a.m.	***2017-01-0468***	***Innovative Weld Design for a Plastic Pressure Vessel*** *Raj S. Roychoudhury, Ford Motor Company*
11:00 a.m.	***2017-01-0472***	***Bending Fatigue and Microstructure of Fillet Welded Joints with High Chromium Stainless Pipe for Catalyst Muffler*** *Gyoko Oh, Tokyo Roki Co., Ltd.*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 6

Welding and Joining and Fastening (Part 3 of 3)

Session Code: ***M216***

Room 334 ***Session Time:*** ***1:00 p.m.***

Presentations in this session include welding (i.e., friction stir, ultrasonic, resistance, arc, laser, etc.) and joining (i.e., brazing, soldering, riveting, bolting, and adhesives) of similar or dissimilar materials (i.e., plastics, composites, aluminum, magnesium, titanium, and conventional and advanced high strength steels). Strength, fracture, and fatigue implications of these methodologies will be discussed.

Organizers - *Pai-Chen Lin, National Chung Cheng Univ.; Jwo Pan, University of Michigan; Tau Tyan, Ford Motor Company*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-0471***	***RingMashing to Low-Alloy Steel -Low-Cost Manufacturing Method of the Powertrain Components*** *Yasuo Kadoya, Yuki Oshino, Origin Electric America Co., Ltd.*
1:30 p.m.	***2017-01-0479***	***Residual Clamping Force Estimation and Lifetime Prediction to Loosening Failure of Bolted Joints*** *Soichi Hareyama, Ken-ichi Manabe, Tokyo Metropolitan University; Makoto Nakashima, UniCarriers Corporation; Takayuki Shimodaira, Akio Hoshi, Hitachi Construction Machinery*
2:00 p.m.	***ORAL ONLY***	***Identifying Hot spots and optimizing welds*** *Venugopal Ravula, Venu Ravula*
2:30 p.m.	***ORAL ONLY***	***Managing welding and joining property data to support efficient testing and accurate simulation*** *Najib Baig, Will Marsden, Granta Design Ltd*

Planned by Materials Modeling and Testing Committee / Materials Engineering Activity

Thursday, April 6

Automotive Composites Structures (Part 1 of 2)

Session Code: ***M302***

Room 336 ***Session Time:*** ***8:00 a.m.***

This session addresses the use of modern automotive composites in structural applications. Design, process and analytical presentations are included as well as research on bonding strategies and techniques. Engineers involved in the design and use of advanced composites will find this session of value.

Organizers - *Somasekhar Bobba, SABIC Innovative Plastics; Y Charles Lu, Univ. of Kentucky; Srikanth Pilla, Clemson Univ.; Santosh Kumar Sarang, Aisin Technical Center of America; Richard Dale Tonda, SEA, Ltd.*

Time	Paper No.	Title
8:00 a.m.	**ORAL ONLY**	***Technical Keynote: Overview on Crashworthy Carbon Thermoplastic B-pillar Program***
		The purpose of this project was to investigate the computational tools for the design, optimization and manufacture of carbon fiber thermoplastic materials for vehicle side frame structures (e.g., B-pillar) subjected to high-velocity side-impact crash loading, and to investigate and demonstrate the appropriateness of simulative methods and tools to adequately predict behavior relevant for the assessment of vehicle safety. The B-pillar is the support post that connects a vehicleâ€™s roof to its body at the rear of the front occupant door that provides the major source of resistance to occupancy compartment intrusion during a side-impact collision. The B-pillar was developed using computer-aided design (CAD) and computer-aided engineering (CAE) and evaluated using both simulation and hardware for legal safety requirements. To address this issue, the Department of Transportationâ€™s National Highway Traffic Safety Administration (DoT/NHTSA) awarded the National Center for Manufacturing Sciences (NCMS) a contract to research this material and to evaluate its impact on vehicle crash safety and weight savings. *A project team, led by NCMS, was formed consisting of two technology providers, Bayerische Motoren Werke (BMW) and the University of Delaware Center for Composite Materials (UD-CCM). Within the scope of this project, BMW assisted UD-CCM by supplying vehicle design and safety requirements derived from full vehicle crash simulations as well as feedback and guidance on all project tasks. UD-CCM conducted composite design, analysis and optimization computational tasks, developed tooling and novel processing methods for forming and multi-material joining, and manufactured full-size carbon fiber thermoplastic B-pillar assemblies that were tested under full-energy drop tower tests simulating side-impact crash conditions. The overall goals of this project were met by the design, manufacture and testing of carbon fiber thermoplastic B-pillar that offered 60% weight savings over the steel baseline and satisfied the side-impact crash requirements established in the program. The dynamic impact and crush response of the B-pillar was adequately modeled using computational tools. Opportunities for improvement in materials constitutive models and modeling approaches were identified based on detailed correlations with the sub-component and full-scale test results.* *Shridhar Yarlagadda, Univ. of Delaware*
9:00 a.m.	**2017-01-0500**	***Damping properties and NVH Modal Analysis Results of Carbon Fiber Composite Vehicle Components*** *Yuksel Gur, David Wagner, Ford Motor Company*
9:30 a.m.		***BREAK***

10:00 a.m.	***2017-01-0504***	***X-ray Curing of Carbon Fiber Composites for Structural Automotive Components*** *Anthony Berejka, New York State Vehicle Composite Program; Dan Montoney, Rapid Cure Technologies; Dan Dispenza, Nordan Composite Technologies; Len Poveromo, Composite Prototyping Center; Rick Galloway, IBA Industrial Inc.; Mark Driscoll, SUNY ESF; Marshall Cleland, IBA Industrial Inc.*
10:30 a.m.	***2017-01-0498***	***Development of GFRTP Crush Box with Consideration of Use Environment and Effect of Fiber Orientation*** *Tomoya Yabu, Shigeto Yasuhara, Masakazu Kashiwagi, Honda R&D Co., Ltd.*
11:00 a.m.	***2017-01-0501***	***Design and Development of a Composite A-Pillar to Reduce Obstruction Angle in Passenger Cars*** *Sajiree Vaidya, Naga Sai Chakravart Velamakuri, Dept of Mechanical Engineering, Clemson University; Piyush Agarwal, Dept of Automotive Engineering, Clemson University; Srikanth Pilla, Clemson University; David Schmueser, Clemson-ICAR*

Planned by Polymers and Coatings Committee / Materials Engineering Activity

Thursday, April 6

Automotive Composites Structures (Part 2 of 2)

Session Code: ***M302***

Room 336 ***Session Time:*** ***1:00 p.m.***

This session addresses the use of modern automotive composites in structural applications. Design, process and analytical presentations are included as well as research on bonding strategies and techniques. Engineers involved in the design and use of advanced composites will find this session of value.

Organizers - *Somasekhar Bobba, SABIC Innovative Plastics; Y Charles Lu, Univ. of Kentucky; Srikanth Pilla, Clemson Univ.; Santosh Kumar Sarang, Aisin Technical Center of America; Richard Dale Tonda, SEA, Ltd.*

Time	***Paper No.***	***Title***
1:00 p.m.	***ORAL ONLY***	***Technical Keynote: Thermoplastic Composite Hybrid Solutions for Vehicle Lightweighting*** *Automakers view lightweighting of structural components as one of the most attractive options to address upcoming stringent emission norms proposed by various organizations and regulatory agencies across the globe. However, weight reduction of targeted structural components is challenging because of the need to meet design requirements for several primary and secondary functions, which include ensuring the safety and comfort of occupants.* *Dhanendra Kumar Nagwanshi, SABIC*
2:00 p.m.	***2017-01-0465***	***Numerical Simulation of CFRP Thin-Walled Tubes Subjected to Quasi-Static Axial Crushing*** *HaiYan Yu, Siji Chen, Tongji University*
2:30 p.m.	***ORAL ONLY***	***Development of an integrated software package for predicting the effective elastic constants of chopped fiber reinforced composites*** *Fengrui Liu, University of Western Ontario; Yang Li, Ford Motor Company; Jia Xue, University of Western Ontario; Hui Liu, Wuhan University, Wuhan, China; Danielle Zeng, Ford Research and Innovation Center; Liying Jiang, University of Western Ontario*

3:00 p.m.	***2017-01-0503***	***Testing of Impact Toughness of Fiber Reinforced Composite Laminates*** *Ahmad Waqar Tehami, Kamran Asim, Shahzad Sarwar, National University of Sciences and Technology*

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Thursday, April 6

Multi-Discipline Interaction and Special CAE Applications

Session Code: ***M213***

Room 338 ***Session Time:*** ***8:00 a.m.***

This session will address recent advances in simulation technologies at scales ranging from theoretical development, real world CAE applications, and future development of the special stress and fatigue analyses techniques. The session is focus on the use of the combination of the dynamic, static, linear and nonlinear Finite Element Method (FEM) methods, Computational Fluid Dynamics (CFD), and Multibody Dynamics (MBD) to evaluate the stress, noise vibration & fatigue performance of the vehicle components and / or cross functional vehicle system.

Organizers - *Fan Li, GM; Peiran Ding, ANSYS Inc.; Robert L. Geisler, General Motors LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0452***	***Interpolated Selective Area Mechanical Roughening for Thermally Sprayed Engine Bores*** *David A. Stephenson, Ford Motor Company*
8:30 a.m.	***2017-01-0451***	***Thermal Response of Aluminum Engine Block During Thermal Spraying of Bores: Comparison of FEA and Thermocouple Results*** *Klaus-Peter Heinig, David A. Stephenson, Timothy G. Beyer, Ford Motor Company*
9:00 a.m.	***2017-01-0453***	***A Thermo-Structural Finite Element Analysis for Relaxation of Interference Fit at an Elevated Temperature*** *Zane Yang, Valeo*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0455***	***Silent Block Bush Design and Optimization for Pick-Up Truck Leaf Spring*** *Harshad Hatekar, Baskar Anthonysamy, V. Saishanker, Lakshmi Pavuluri, Gurdeep Singh Pahwa, Mahindra & Mahindra, Ltd.*
10:30 a.m.	***2017-01-0454***	***Modeling Contact in Abaqus with Nonlinear Springs*** *Colin Young, Ford Motor Company*

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Thursday, April 6

Systems Diagnostics (Part 1 of 2)

Session Code: ***AE203***

Room 354 ***Session Time:*** ***8:00 a.m.***

Vehicle diagnostics deals with the development, delivery and execution of diagnostic procedures for vehicle systems. This session will explore new technologies, processes and trends in the area of vehicle diagnostics.

Organizers - *Daniel C. Morris, Caterpillar Inc.; Robert Gruszczynski, Volkswagen of America*

Time	***Paper No.***	***Title***

8:00 a.m.	***2017-01-1690***	***Automated Generation of Service Procedure Content from IVHM Fault Model*** *Dirk Hall, Tim Felke, Honeywell Aerospace*
8:30 a.m.	***2017-01-1687***	***Analysis of Warranty Data to Identify Improvements to Vehicle Reliability and Service Information*** *Nick Mikulec, Tim Felke, Shaunak Bangale, Honeywell Aerospace*
9:00 a.m.	***2017-01-1685***	***Comprehensive Diagnostic Methodology*** *Gopal K. Chamarthi, Andrew Sarkar, Paul Baltusis, Mark Laleman, Ford Motor Company*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1688***	***Non-Intrusive Diagnostics of Oxygen Sensors*** *Hassene Jammoussi, Imad Makki, Ford Motor Company*
10:30 a.m.	***2017-01-1684***	***Diagnostics of Individual Air Fuel Ratio Cylinder Imbalance*** *Hassene Jammoussi, Imad Makki, Michael Kluzner, Robert Jentz, Ford Motor Company*
11:00 a.m.	***2017-01-1686***	***Electronic Does Not Equal Smart: Service Documentation and Brand Quality*** *Muhammad Askar, Mentor Graphics Corp.*

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Thursday, April 6

Systems Diagnostics (Part 2 of 2)

Session Code: ***AE203***

Room 354 ***Session Time:*** ***1:00 p.m.***

Vehicle diagnostics deals with the development, delivery and execution of diagnostic procedures for vehicle systems. This session will explore new technologies, processes and trends in the area of vehicle diagnostics.

Organizers - *Daniel C. Morris, Caterpillar Inc.; Robert Gruszczynski, Volkswagen of America*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1689***	***Measures to Prevent Unauthorized Access to the In-Vehicle E/E System, Due to the Security Vulnerability of a Remote Diagnostic Tester*** *Peter Subke, Softing Automotive Electronics GmbH; Muzafar Moshref, Softing North America Inc.; Andreas Vach, Markus Steffelbauer, Softing Automotive Electronics GmbH*
1:30 p.m.	***ORAL ONLY***	***Challenges for Inspection and Maintenance*** *Paul R. Hamburg, Volkswagen Group of America Inc.*

2:00 p.m.	***Panel***	***Technical Expert Panel Discussions: Big Data for Diagnostics Development*** *Diagnostics have been around for a long time and are well understood and standardized. Huge amounts of diagnostic data have piled up over the years. Many variants and dimensions must be supported. Fortunately, the data is machine readable. This presentation gives an overview of the application of big data techniques to help improve diagnostic development and shows some case studies for the next generation of diagnostic development.* ***Organizers -*** *Mark N. Pope, General Motors LLC* ***Moderators -*** *Andreas Hege, RA Consulting GMBH; Mark N. Pope, General Motors LLC* ***Panelists -*** *Phil D'Eon, Casebank Technologies Inc.; Jim Roal, Caterpillar Inc.; Troy Schilling, Robert Bosch LLC; Evandro Silva, Volvo Trucks North America; Peter Subke, Softing Automotive Electronics GmbH;*
3:30 p.m.	***Panel***	***Technical Expert Panel Discussions: Updating J817*** *These days, all too often we see the service technician required to remove the engine, transmission, or both to reach a simple part for repair or replacement. SAE J817 Serviceability Index Standard is designed to improve serviceability and maintainability, thereby improving equipment uptime and reducing service and warranty costs. The presentation followed by an expert panel will address the business needs of J817 to help engineering organizations make appropriate cost/benefit analysis and adopting it.* ***Organizers -*** *Mark N. Pope, General Motors LLC* ***Moderators -*** *Mark N. Pope, General Motors LLC* ***Panelists -*** *Joseph Barkai; Daniel C. Morris; Peter Subke, Softing Automotive Electronics GmbH; Arnold Taube; James (Jim) E. Wagner, Caterpillar Inc.;*

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Thursday, April 6

Systems Engineering (Part 2 of 3)

Session Code: ***AE101***

Room 356 ***Session Time:*** ***8:00 a.m.***

This session covers intelligent and efficient approaches to high level system design, analysis and integration as well as considerations for vehicle-level optimization of cost and energy. System definition includes components, sub-assemblies and complete integrated vehicle systems, including electronic systems and human machine interfaces.

Organizers - *Amit Choudhury, TRW Automotive; Krzysztof Czarnecki, Univ. of Waterloo; Subramaniam Ganesan, Oakland Univ.; Paolo Giusto, Grant Soremekun, Andrew Brocker, General Motors LLC; Phares A. Noel, Diversified Engineering Concepts LLC; Kanaparty Rao; Ramesh S, General Motors LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1600***	***Optimizing the Rear Fascia Cutline Based On Investigating Deviation Sources of the Body Panel Fit and Finish*** *James Mansour, FCA US LLC; Badih Jawad, Liping Liu, Vernon Fernandez, Sabah Abro, Lawrence Technological University; Jeff Tibbenham, FCA US LLC*

8:30 a.m.	***2017-01-1601***	***New Approach of Tools Application for Systems Engineering in Automotive Software Development*** *Max Mauro Santos, Celso Mendes, Taysa Banik, Felipe Franco, JoÃ£o Neme, UTFPR-PG; Wanderley Prado, Fernando Cerri, OpenCadd; Lauro Nunes, Marcopolo*
9:00 a.m.	***2017-01-1602***	***Industrial Base Sustainment through Risk Modeling with Model-Based Systems Engineering Applications*** *Garett Scott Patria, U.S. Army TARDEC; James A. Mynderse, Lawrence Technological University*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1604***	***Enhanced Process to Improve Supplierâ€™s Quality and Reduce Warranty*** *Christina Michael, General Motors LLC; Badih Jawad, Liping Liu, Vernon Fernandez, Sabah Abro, Lawrence Technological University; Craig Zinser, Dave Guidos, General Motors LLC*
10:30 a.m.	***2017-01-1605***	***Electric Drive Transient Behavior Modeling: Comparison of Steady State Map Based Offline Simulation and Hardware-in-the-Loop Testing*** *Paul Chambon, Dean Deter, David Smith, Oak Ridge National Laboratory; Grant Bauman, University of Tennessee*
11:00 a.m.	***2017-01-1607***	***Effects of Inlet Curved Spacer Arrancement on Centrifugal Pump Impellers*** *Munther Hermez, Badih Jawad, Liping Liu, Lawrence Technological University; Eli Oklejas, Fluid Equipment Development Company*

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Thursday, April 6

Systems Engineering (Part 3 of 3)

Session Code: ***AE101***

Room 356 ***Session Time:*** ***1:00 p.m.***

This session covers intelligent and efficient approaches to high level system design, analysis and integration as well as considerations for vehicle-level optimization of cost and energy. System definition includes components, sub-assemblies and complete integrated vehicle systems, including electronic systems and human machine interfaces.

Organizers - *Amit Choudhury, TRW Automotive; Krzysztof Czarnecki, Univ. of Waterloo; Subramaniam Ganesan, Oakland Univ.; Paolo Giusto, Grant Soremekun, Andrew Brocker, General Motors LLC; Phares A. Noel, Diversified Engineering Concepts LLC; Kanaparty Rao; Ramesh S, General Motors LLC*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1608***	***Real-Time Coupling Coefficient Estimation for Inductive Power Transfer Systems*** *Sara Dadras, Hadi Malek, Ford Motor Company*
1:30 p.m.	***2017-01-1609***	***Investigation of the Effect of Vortex Generation on Flow Structure and Heat Transfer Enhancement using Particle Image Velocimetry (PIV)*** *Saleh Morjan, Badih Jawad, Liping Liu, Lawrence Technological University*
2:00 p.m.	***2017-01-1610***	***Reducing the Acoustic Surface Power of a Cooling Fan Using the Mesh Morpher Optimizer*** *Mike Kheirallah, Advanced Safety and Energy; Badih Jawad, Liping Liu, Lawrence Technological University*

2:30 p.m.	***2017-01-1606***	***Synchronous Motor with Silicon Steel Salient Poles Rotor and All Coils Placed on the Stator*** *Sergey P. Gladyshev, University of Michigan-Dearborn; Pavel Gladyshev, University College Dublin; Irina Okrainskaya, South Ural State University*
3:00 p.m.	***2017-01-1611***	***Experimental Investigation of the Impact of Nanofluids on Heat Transfer Performance of a Motorcycle Radiator*** *Elankathiravan Mathivanan, David Gasior, Liping Liu, Kingman Yee, Yawen Li, Lawrence Technological University*
3:30 p.m.	***2017-01-1614***	***Use of V-Cycle Methodology to Develop Mechatronic Fuel System Functions*** *David Hill, Inergy Automotive Systems LLC; Joel Op de Beeck, Plastic Omnium Auto Inergy; Mihai Baja, Issam Djemili, Plastic Omnium Advanced Innovation; Paul Reuther, Inergy Automotive Systems LLC; Iris Sutra, Plastic Omnium Advanced Innovation*

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Thursday, April 6

Infotainment Systems

Session Code: ***AE206***

Room 357 ***Session Time:*** ***8:00 a.m.***

This session covers topics relating to vehicular entertainment and information systems. Specific subjects include multiband antennas, satellite radio reception, measuring and evaluating audio systems, navigation, displays, infotainment busses, audio amplifiers, and loudspeakers.

Organizers - *Scott A. Rush, General Motors LLC; Robert Klacza, FCA (Retired); Husein Dakroub, Ford Motor Company; Lyle Stanley Bryan, Abraham Shocket, TE Connectivity*

Chairpersons - *Robert Klacza; Husein Dakroub, Ford Motor Company*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1691***	***Design of a 5.9 GHz High Directivity Planar Antenna Using Topology Optimization for V2V Applications*** *Aseim Elfrgani, C. J. Reddy, Altair Engineering*
8:30 a.m.	***2017-01-1696***	***A Low Profile Loop Antenna Design for Automotive Applications*** *John F. Locke, Stephen Schmidt, Ford Motor Company*
9:00 a.m.	***ORAL ONLY***	***Antenna Aspects for WiGig Communications in Cars*** *Jane Xing Yun, TE Connectivity*
10:00 a.m.	***2017-01-1692***	***The Impact of Microphone Location and Beamforming on In-Vehicle Speech Recognition*** *Scott Amman, John Huber, Francois Charette, Brigitte richardson, Joshua Wheeler, Ford Motor Company*
10:30 a.m.	***2017-01-1693***	***Validation of In-Vehicle Speech Recognition Using Synthetic Mixing*** *John Huber, Ranjani Rangarajan, An Ji, Francois Charette, Scott Amman, Joshua Wheeler, Brigitte Richardson, Ford Motor Company*
11:00 a.m.	***2017-01-1694***	***MyFord Dock Development*** *Victor Silva, Renato Veiga, Ford Motor Company*
11:30 a.m.	***2017-01-1695***	***A Multi-Media Gateway for Vehicles*** *Kuang-I Shu, Director of IoE Center, SWU China*

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Thursday, April 6

Smart-grid Technologies

Session Code: ***AE505***

Room 357 ***Session Time:*** ***1:00 p.m.***

This session will provide real world updates on consumer behavior who are part of the DOE awarded EV Project as well as other research using models and consumer data to analyze the effect on the grid during PEV charging. Also presented will be strategies for PEV charging and synergies for integrating PEV's into the grid by way of existing infrastructure.

Organizers - *Soodeh Dadras; Hadi Malek, Ford Motor Company; Michael R. Starke, Oak Ridge National Laboratory*

Time	Paper No.	Title
1:00 p.m.	2017-01-1699	**Model-Based Analysis of V2G Impact on Battery Degradation** *Luting Wang, Bo Chen, Michigan Technological University*
1:30 p.m.	2017-01-1702	**Integration of OpenADR with Node-RED for Demand Response Load Control Using Internet of Things Approach** *Piyush Aggarwal, Bo Chen, Michigan Technological University; Jason Harper, Argonne National Laboratory*
2:00 p.m.	2017-01-1697	**A Modular Designed Three-phase ~98%-Efficiency 5kW/L On-board Fast Charger for Electric Vehicles Using Paralleled E-mode GaN HEMTs** *Hua Bai, University of Michigan-Dearborn; Alan Brown, Matt McAmmond, Hella Electronics Corp.; Juncheng Lu, GaN Systems Inc.*
2:30 p.m.	2017-01-1700	**EV Fingerprinting** *Rebekah L. Houser, Willett Kempton, Rodney McGee, Fouad Kiamilev, Nick Waite, University of Delaware*
3:00 p.m.	2017-01-1701	**Benefits of Stochastic Optimisation with Grid Price Prediction for Electric Vehicle Charging** *Sagar Mody, Thomas Steffen, Loughborough University*

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Thursday, April 6

Intelligent Transportation Systems (Part 3 of 3)

Session Code: ***AE504***

Room 358 ***Session Time:*** ***8:30 a.m.***

Intelligent Transportation Systems (ITS) includes smart vehicles, smart roads and infrastructure, and wired and wireless communications to link them together. This session will provide insights and progress reports on the latest ITS research, development, and deployment around the world. Time to collision estimations, embedded processor control, adaptive cruise control and image recognition along with discussion on the management of safety and safety systems.

Organizers - *Jan-Mou Li, Oak Ridge National Laboratory; Sara Dadras, Ford Motor Company; Hirofumi Onishi, Alpine Electronics of America Inc.*

Chairpersons - *Hirofumi Onishi, Alpine Electronics of America Inc.; Julian Kemp, Spirent Communications*

Time	Paper No.	Title
8:30 a.m.	ORAL ONLY	**Accurate and Resilient Positioning Solutions for Connected/Automated Vehicles** *Hirofumi Onishi, Alpine Electronics of America Inc.; Kazuo Yoshida, Hiroyuki Satoh, Hiroyuki nemoto, Alpine Electronics*

9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-0085***	***Color Variable Speed Limit Sign Visibility for the Freeway Exit Driving Safety*** *Wanyang Xia, Yahui Wu, Gangfeng Tan, Xianyao Ping, Benlong Liu, Wuhan University of Technology*
10:30 a.m.	***ORAL ONLY***	***Wireless Technology Assessment for Vehicle Safety Applications*** *Hirofumi Onishi, Alpine Electronics of America Inc.; Takeshi Hirai, Nagoya Univ; Ryoya Kawasaki, Nagoya University; Hayami Ito, Tokyo Institute of Technology; Tutom Murase, Nagoya Univ*
11:00 a.m.	***ORAL ONLY***	***Developments in the spoofing of Position, Navigation and Timing (PNT) Systems*** *Guy Buesnel, Spirent Communications International Inc.*

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Thursday, April 6

Hardware Design Engineering and Development

Session Code: ***AE106***

Room 358 ***Session Time:*** ***1:00 p.m.***

This session concentrates on the development of embedded hardware that resides in production vehicle electronic modules, and covers all aspects of embedded hardware development including requirements, implementation, algorithms, modeling, and automatic layout and routing. Expert speakers from the embedded hardware community are encouraged to share their experiences and opinions.

Organizers - *Vipul Patel, Eugene F. Saltzberg, General Motors LLC*

Chairpersons - *Vipul Patel, General Motors LLC*

Time	***Paper No.***	***Title***
1:00 p.m.	***2017-01-1668***	***Improving Multi-Voltage Electrical System Performance with Smart Step-Down Converters*** *Amin Emrani, Steve Spadoni, Ford Motor Company*
1:30 p.m.	***2017-01-1669***	***Silicon Carbide Inverter for EV/HEV Application featuring a Low Thermal Resistance Module and a Noise Reduction Structure*** *Keiichiro Numakura, Kenta Emori, Akinori Okubo, Taku Shimomura, Tetsuya Hayashi, Nissan Motor Co., Ltd.*
2:00 p.m.	***2017-01-1667***	***Application of Computer Aided Engineering Tools for Insight into Electromagnetic Compatibility Characteristics of Electrical and Electronic Components for Automotive Systems*** *Scott Piper, Mark Steffka, GM Global Propulsion Systems; Vipul Patel, General Motors LLC*

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Thursday, April 6

Software / System Testing and Validation (Part 1 of 2)

Session Code: ***AE109***

Room 359 ***Session Time:*** ***8:00 a.m.***

A major development challenge of the current and next generation vehicles is the validation of the electronics and software subsystems which are exploding in size, criticality and complexity in . This session brings out the presentations highlighting how the technical community in academia and industry are responding to this challenge through novel and effective processes, methods and tools for testing and validation of electronic and software subsystems.

Organizers - *Ambar A. Gadkari, KPIT Infosystems Inc.; Ramesh S, General Motors LLC; Chirag Sonchal, Tata Consultancy Services*

Time	Paper No.	Title
8:00 a.m.	***2017-01-1671***	***Reactive-Replay Approach for Verification and Validation of Closed-Loop Control Systems in Early Development*** *Johannes Bach, FZI Forschungszentrum Informatik; Marc HolzÃ¶pfel, Porsche AG; Stefan Otten, Eric Sax, FZI Forschungszentrum Informatik*
8:30 a.m.	***2017-01-1672***	***Test Scenario Generation for Driving Simulators Using Constrained Randomization Technique*** *Siddartha Khastgir, Gunwant Dhadyalla, Stewart Birrell, WMG, University of Warwick, UK; Sean Redmond, Ross Addinall, Vertizan Ltd; Paul Jennings, WMG, University of Warwick, UK*
9:00 a.m.	***2017-01-1676***	***Efficient Testing of Multivariable Systems*** *Hartmut Lackner, Model Engineering Solutions GmbH*
9:30 a.m.		***BREAK***
10:00 a.m.	***2017-01-1679***	***Hardware Tracing of Embedded Multi-Core Real-Time Systems*** *Felix Martin, Michael Deubzer, Timing-Architects Embeded Systems GmbH*
10:30 a.m.	***2017-01-1683***	***Real-Time Implementation and Validation for Automated Path Following Lateral Control Using Hardware-in-the-Loop (HIL) Simulation*** *Adit Joshi, Ford Motor Company*

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Thursday, April 6

Software / System Testing and Validation (Part 2 of 2)

Session Code: ***AE109***

Room 359 ***Session Time:*** ***1:00 p.m.***

A major development challenge of the current and next generation vehicles is the validation of the electronics and software subsystems which are exploding in size, criticality and complexity in . This session brings out the presentations highlighting how the technical community in academia and industry are responding to this challenge through novel and effective processes, methods and tools for testing and validation of electronic and software subsystems.

Organizers - *Ambar A. Gadkari, KPIT Infosystems Inc.; Ramesh S, General Motors LLC; Chirag Sonchal, Tata Consultancy Services*

Time	Paper No.	Title
1:00 p.m.	***2017-01-1675***	***Camera Alignment System for Passive Safety Crash Tests*** *GenÃ-s Mensa, NÃºria Parera, Alba Fornells, Applus + Idiada Spain*
1:30 p.m.	***2017-01-1674***	***Analysis of Geographically Distributed Vehicle Powertrain System Validation Platform Based on X-in-the-Loop Theory*** *Wenxu NIU, Ke Song, Tong Zhang, Tongji University*
2:00 p.m.	***2017-01-1682***	***Automated Electrified Powertrain Robustness Testing Tool*** *Matthew von der Lippe, Mark Waterbury, Walter J. Ortmann, Bernard Nefcy, Scott Thompson, Ford Motor Company*

2:30 p.m.	***2017-01-1678***	***Pattern Generation based Instrument Cluster Virtual Validation***
		Joseph Antony John Selvaraj, FCA Engineering India Pvt Ltd; Sivapalan Balanayagam, FCA US LLC
3:00 p.m.	***2017-01-1681***	***Driveable Automotive Electrical & Electronics Test-Board***
		Kyaw Soe, Ford Motor Company

Planned by Automobile Electronics Activity / EMB Land and Sea Group

Thursday, April 6

Electric Motor & Power Electronics (Part 5 of 5)

Session Code: ***PFL740***

Room 410 B ***Session Time:*** ***8:00 a.m.***

Power electronics and electric motors are essential for improving vehicle efficiency through drivetrain electrification. Technologies that support high efficiency, high power density, and low cost motors and power modules are required for the success of vehicle electrification.

Organizers - *John Czubay, General Motors; Laura Marlino, Oak Ridge National Laboratory; Constantine N. Raptis, GM Powertrain; Serdar Yonak, Ford Motor Company*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Wireless Charging Integration Challenges and Opportunities***
		Lee Barnes, Ricardo
8:30 a.m.	***2017-01-1241***	***Center-Tapped Loosely Coupled Transformer Design for iCab and EV Interoperable Wireless Charger***
		Wei Zhang, DENSO International America, Inc.; Rajesh Malhan, DENSO International America Inc.
9:00 a.m.	***2017-01-1216***	***More Efficient Inductive Electric Vehicle Charger: Using Autonomy to Improve Energy Efficiency***
		Edward C. Fontana, Rick Barnett, Robert Catalano, James Harvey, Jiacheng He, George Ottinger, John Steel, GE Critical Power
9:30 a.m.	***2017-01-1209***	***Modeling of Square Planar Spiral Coils Between Two Multilayer Media for Wireless Power Transfer Systems in Electric Vehicles***
		Zhichao Luo, Tongji Universtiy of China; Xuezhe Wei, Tongji University of China
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1233***	***Exploration of the Impact of High Voltage Ground Fault in an Electric Vehicle Connected to Earthing Systems Worldwide***
		Mohamed A. Elshaer, Allan Gale, Chingchi Chen, Ford Motor Company
11:00 a.m.	***2017-01-1245***	***Study of High Power Dynamic Charging System***
		Takamitsu Tajima, Hideki Tanaka, Takeo Fukuda, Yoshimi Nakasato, Wataru Noguchi, Yoshikazu Katsumasa, Tomohisa Aruga, Honda R&D Co., Ltd.

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Combustion Control and Optimization (Part 1 of 2)

Session Code: ***PFL280***

Room 411 A ***Session Time: 8:00 a.m.***

This session covers engine combustion control and optimization techniques. Topics include engine combustion diagnostics as specialized for control, control methodologies and algorithms, optimization, related combustion sensing, etc.

Organizers - *Jaime Martin, Universitat Politecnica de Valencia; Michael Prucka, FCA US LLC; Robert Gary Prucka, Clemson Univ.*

Time	Paper No.	Title
8:00 a.m.	2017-01-0792	**Knock and Pre-Ignition Detection Using Ion Current Signal on a Boosted Gasoline Engine** *Sunyu Tong, Zhaohui Yang, Xiaoyu He, Jun Deng, Zhijun Wu, Liguang Li, Tongji University*
8:30 a.m.	2017-01-0784	**Investigation on Pre-Ignition Combustion Events and Development of Diagnostic Solutions Based on Ion Current Signals** *Nicolo Cavina, Nahuel Rojo, University of Bologna; Luca Poggio, Lucio Calogero, Ruggero Cevolani, Ferrari Auto Spa*
9:00 a.m.	2017-01-0785	**Knock Control Based on Engine Acoustic Emissions: Calibration and Implementation in an Engine Control Unit** *Nicolo Cavina, Andrea Businaro, University of Bologna; Matteo De Cesare, Luigi Paiano, MAGNETI MARELLI SpA*
9:30 a.m.	2017-01-0786	**Application of Acoustic and Vibration-Based Knock Detection Techniques to a High Speed Engine** *Nicolo Cavina, Andrea Businaro, University of Bologna; Matteo De Cesare, Federico Monti, MAGNETI MARELLI SpA; Alberto Cerofolini, Alma Automotive S.r.l*
10:00 a.m.		**BREAK**
10:30 a.m.	2017-01-0791	**Assessment of Model-Based Knock Prediction Methods for Spark-Ignition Engines** *Konstantinos Siokos, Zhizhen He, Robert Prucka, Clemson University*
11:00 a.m.	2017-01-0794	**Development and Assessment of Pressure-Based and Model-Based Techniques for the MFB50 Control of a Euro VI 3.0L Diesel Engine** *Roberto Finesso, Omar Marello, Daniela Misul, Ezio Spessa, Massimo Violante, Yixin Yang, Politecnico di Torino; Gilles Hardy, Christian Maier, FPT Motorenforschung AG*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Combustion Control and Optimization (Part 2 of 2)

Session Code: ***PFL280***

Room 411 A ***Session Time: 1:30 p.m.***

This session covers engine combustion control and optimization techniques. Topics include engine combustion diagnostics as specialized for control, control methodologies and algorithms, optimization, related combustion sensing, etc.

Organizers - *Jaime Martin, Universitat Politecnica de Valencia; Michael Prucka, FCA US LLC; Robert Gary Prucka, Clemson Univ.*

Time	Paper No.	Title

1:30 p.m.	***2017-01-0789***	***Heat Release Based Virtual Combustion Sensor Signal Bias Sensitivity*** *Tobias Johansson, Ola Stenlaas, Scania CV AB*
2:00 p.m.	***2017-01-0790***	***Development and Implementation of a Common Rail Fuel Injection System for Flexible Combustion for an Experimental Medium Duty Diesel Engine*** *Valentin Soloiu, Remi Gaubert, Martin Muinos, Jose Moncada, Thomas Beyerl, Gustavo Molina, Georgia Southern University*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Homogeneous Charge Compression Ignition, HCCI (Part 1 of 2)

Session Code: ***PFL230***

Room 411 B ***Session Time:*** ***8:00 a.m.***

Classical HCCI combustion with temperature controlling combustion onset and only a modest effect of fuel injection. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, combustion control, and mode change are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL 110 or PFL120 modeling sessions.

Organizers - *Scott Goldsborough, Argonne National Laboratory; Darko Kozarac, Univ. of Zagreb; Mahdi Shahbakhti, Michigan Technological Univ.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-0733***	***HCCI of Wet Ethanol on a Dedicated Cylinder of a Diesel Engine*** *Mario Martins, Ivanir Fischer, Franciel Gusberti, Rafael Sari, Macklini Dalla Nora, Federal University of Santa Maria*
8:30 a.m.	***2017-01-0732***	***Experimental Investigation and Modelling of the In-Cylinder Heat Transfer during Ringing Combustion in an HCCI Engine*** *Stijn Broekaert, Thomas De Cuyper, Michel De Paepe, Sebastian Verhelst, Ghent University*
9:00 a.m.	***2017-01-0735***	***Numerical Study on a High Efficiency Gasoline Reformed Molecule HCCI Combustion Using Exergy Analysis*** *Hao Yu, Wanhua Su, Tianjin University*
9:30 a.m.	***2017-01-0730***	***A 5-Zone Model to Improve the Diagnosis Capabilities of a Rapid Compression-Expansion Machine (RCEM) in Autoignition Studies*** *Jose M Desantes, J. Javier Lopez, Jose M Garcia-Oliver, Dario Lopez-Pintor, CMT Motores Termicos UPV*
10:00 a.m.		***BREAK***
10:30 a.m.	***ORAL ONLY***	***Octane rating and fuel sensitivity under compression ignition conditions*** *Tong Wu, Oakland University; Mingyuan Tao, Dan DelVescovo, Oakland Univ; Peng Zhao, Oakland Univ.*
11:00 a.m.	***2017-01-0734***	***Simulating HCCI Blending Octane Number of Primary Reference Fuel with Ethanol*** *Eshan Singh, Muhammad Waqas, Bengt Johansson, Mani Sarathy, King Abdullah University of Science and Technology*

11:30 a.m.	***2017-01-0726***	***Auto-Ignition of Iso-Stoichiometric Blends of Gasoline-Ethanol-Methanol (GEM) in SI, HCCI and CI Combustion Modes*** *Muhammad Waqas, Nimal Naser, Mani Sarathy, King Abdullah University of Science and Technology; Jeroen Feijs, Eindhoven University of Technology; Kai Morganti, Saudi Aramco; Gustav Nyrenstedt, Bengt Johansson, King Abdullah University of Science and Technology*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Homogeneous Charge Compression Ignition, HCCI (Part 2 of 2)

Session Code: ***PFL230***

Room 411 B ***Session Time:*** ***1:30 p.m.***

Classical HCCI combustion with temperature controlling combustion onset and only a modest effect of fuel injection. Papers describing experiments and test data, simulation results focused on applications, fuel/additive effects, combustion control, and mode change are invited and will be placed in appropriate sub-sessions. Papers with an emphasis on the modeling aspects of combustion are encouraged to be submitted into PFL 110 or PFL120 modeling sessions.

Organizers - *Scott Goldsborough, Argonne National Laboratory; Darko Kozarac, Univ. of Zagreb; Mahdi Shahbakhti, Michigan Technological Univ.*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-0729***	***Energy Analysis of Low-Load Low-Temperature Gasoline Combustion with Auxiliary-Fueled Negative Valve Overlap*** *Isaac Ekoto, Benjamin Wolk, Sandia National Laboratories; William Northrop, University of Minnesota*
2:00 p.m.	***2017-01-0731***	***Increasing the Load Range, Load-to-Boost Ratio, and Efficiency of Low-Temperature Gasoline Combustion (LTGC) Engines*** *John E. Dec, Jeremie Dernotte, Chunsheng Ji, Sandia National Laboratories*
2:30 p.m.	***2017-01-0728***	***Efficiency Improvement of Boosted Low-Temperature Gasoline Combustion Engines (LTGC) using a Double Direct-Injection Strategy*** *Jeremie Dernotte, John Dec, Chunsheng Ji, Sandia National Laboratories*
3:00 p.m.	***2017-01-0736***	***A Framework for Quantifying Measurement Uncertainties and Uncertainty Propagation in HCCI/LTGC Engine Experiments*** *Guillaume Petitpas, Matthew J. McNenly, Russell A. Whitesides, Lawrence Livermore National Laboratory*
3:30 p.m.	***2017-01-0727***	***Ozone Seeding Effect on the Ignition Event in HCCI Combustion of Gasoline-Ethanol Blends*** *Ida Truedsson, Christine Rousselle, Fabrice Foucher, UniversitÃ© d'OrlÃ©ans*

Planned by Engine Combustion / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Engine Boosting Systems (Part 1 of 2)

Session Code: ***PFL520***

Room 411 C ***Session Time:*** ***8:00 a.m.***

This session will cover conceptual, modeling and experimental studies relating to advanced turbochargers/superchargers and advanced boosting systems to achieve increased power density, better fuel economy, and reduced emissions.

Organizers - *Marcello Canova, Ohio State University; Aaron W. Costall, Imperial College London; Eric Krivitzky, Concepts NREC; Leonid Tartakovsky, Technion Israel Inst. of Technology*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1032***	***Control-Oriented Compressor Model with Adiabatic Efficiency Extrapolation*** *Xavier Llamas, Lars Eriksson, LinkÃ¶ping University*
8:30 a.m.	***2017-01-1040***	***Optimal Pressure Based Detection of Compressor Instabilities Using the Hurst Exponent*** *Bertrand Kerres, Mihai Mihaescu, KTH Royal Institute of Technology; Matthieu Gancedo, Ephraim Gutmark, University of Cincinnati*
9:30 a.m.	***2017-01-1035***	***Potentials of Electrical Assist and Variable Geometry Turbocharging System for Heavy-Duty Diesel Engine Downsizing*** *Xingyu Xue, John Rutledge, Caterpillar Inc.*
9:30 a.m.	***2017-01-1037***	***Feasibility and Design Analysis of a Pressure Wave Supercharger Adaption on a 600 cm³ Spark Ignited Engine*** *Christoph Haidinger, Wolfgang Kriegler, Adrian Millward-Sadler, Philipp Eder, University of Applied Sciences Graz*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1036***	***Heat Transfer Effect on Performance Map of a Turbocharger Turbine for Automotive Application*** *Silvia Marelli, Simone Gandolfi, Massimo Capobianco, University of Genoa*

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Engine Boosting Systems (Part 2 of 2)

Session Code: ***PFL520***

Room 411 C ***Session Time:*** ***1:30 p.m.***

This session will cover conceptual, modeling and experimental studies relating to advanced turbochargers/superchargers and advanced boosting systems to achieve increased power density, better fuel economy, and reduced emissions.

Organizers - *Marcello Canova, Ohio State University; Aaron W. Costall, Imperial College London; Eric Krivitzky, Concepts NREC; Leonid Tartakovsky, Technion Israel Inst. of Technology*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-1034***	***Numerical investigation of the impact of nozzle endwall clearance distribution on variable nozzle turbine performance*** *Ben Zhao, Michigan State University; Liangjun Hu, Ford Motor Company; Abraham Engeda, Michigan State Univeristy; Harold Sun, Ford Motor Company*
2:00 p.m.	***2017-01-1039***	***Study on the Interaction of Clearance Flow and Shock Wave in a Turbine Nozzle*** *Xinguo Lei, Mingxu Qi, Beijing Institute of Technology; Harold Sun, Ford Motor Company; Xin Shi, Beijing Institute of Technology; Liangjun Hu, Ford Motor Company*
2:30 p.m.	***ORAL ONLY***	***Variable Nozzle Turbine Turbocharger for Gasoline â€œMillerâ€ Engine*** *Pierre-Jean Cancalon, Honeywell Turbo Technologies*

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Thursday, April 6

0-D and 1-D Modeling and Numerics (Part 4 of 6) Physical plant models for controls

Session Code: ***PFL110***

Room 412 A ***Session Time:*** ***8:00 a.m.***

Separate sub-sessions cover zero-dimensional, one-dimensional, and quasi-dimensional models for simulation of SI and CI engines with respect to: engine breathing, boosting, and acoustics; SI combustion and emissions; CI combustion and emissions; fundamentals of engine thermodynamics; numerical modeling of gas dynamics; thermal management; mechanical and lubrication systems; system level models for controls; system level models for vehicle fuel economy and emissions predictions.

Organizers - *Marcello Canova, Ohio State University; Federico Millo, Politecnico di Torino; Christof Schernus, FEV Europe GmbH; Per Tunestal, Lund University*

Time	Paper No.	Title
8:00 a.m.	2017-01-0534	***Modeling Thermal Engine Behavior Using Artificial Neural Network*** *Bojan S. Jander, Roland Baar, Technische Universitat Berlin*
8:30 a.m.	2017-01-0527	***Air Charge and Residual Gas Fraction Estimation for a Spark-Ignition Engine Using In-Cylinder Pressure*** *Arya Yazdani, Jeffrey Naber, Mahdi Shahbakhti, Paul Dice, Michigan Technological University; Chris Glugla, Stephen Cooper, Douglas McEwan, Garlan Huberts, Ford Motor Company*
9:00 a.m.	2017-01-0536	***Software Test and Calibration Using Virtual Manufacturing*** *William Goodwin, GM Powertrain; Claudio Mancuso, GM Global Propulsion Systems; Nicolas Brown, Synopsys Inc.*
9:30 a.m.	2017-01-0544	***Simulation-Based Control of Transient SCE Operation*** *Philipp Mayr, Gerhard Pirker, LEC GmbH; Andreas Wimmer, Graz University of Technology; Markus Krenn, LEC GmbH*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Thursday, April 6

0-D and 1-D Modeling and Numerics (Part 5 of 6) Models for Mechanical and Hydro-mechanical Systems and Drivelines

Session Code: ***PFL110***

Room 412 A ***Session Time:*** ***1:30 p.m.***

Separate sub-sessions cover zero-dimensional, one-dimensional, and quasi-dimensional models for simulation of SI and CI engines with respect to: engine breathing, boosting, and acoustics; SI combustion and emissions; CI combustion and emissions; fundamentals of engine thermodynamics; numerical modeling of gas dynamics; thermal management; mechanical and lubrication systems; system level models for controls; system level models for vehicle fuel economy and emissions predictions.

Organizers - *Federico Millo, Politecnico di Torino; Christof Schernus, FEV Europe GmbH; Jonathan Zeman, Gamma Technologies Inc.*

Time	Paper No.	Title
1:30 p.m.	2017-01-0532	***Model-Based Fuel Economy Technology Assessment*** *Hoon Lee, Byungho Lee, Sejun Kim, Hyundai-Kia America Technical Center Inc.; Namdoo Kim, Aymeric Rousseau, Argonne National Laboratory*

2:00 p.m.	***2017-01-0533***	***Characterizing Factors Influencing SI Engine Transient Fuel Consumption for Vehicle Simulation in ALPHA*** *Paul Dekraker, Mark Stuhldreher, US Environmental Protection Agency; Youngki Kim, Southwest Research Institute*
2:30 p.m.	***2017-01-0522***	***A Fully-Analytical Fuel Consumption Estimation for the Optimal Design of Light- and Heavy-Duty Series Hybrid Electric Powertrains*** *Jianning Zhao, Antonio Sciarretta, IFP Energies Nouvelles*
3:00 p.m.	***2017-01-0528***	***Bayesian Parameter Estimation for Heavy-Duty Vehicles*** *Eric Miller, Arnaud Konan, Adam Duran, National Renewable Energy Laboratory*

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Controls for Hybrids and Electric Powertrains (Part 1 of 2)

Session Code: ***PFL750***

Room 412 B ***Session Time:*** ***8:00 a.m.***

This session covers powertrain control processes related to achieving stringent market fuel economy, emissions, performance, reliability, and quality demands of hybrid and electric powertrains. Topics include the control, calibration, and diagnostics of the engine, powertrain, and supporting electromechanical subsystems related to energy management.

Organizers - *Dohoy Jung, Univ. of Michigan-Dearborn; Jason McConnell, IAV Automotive Engineering Inc.; Bin Wu, Mercedes Benz R&D North America*

Time	***Paper No.***	***Title***
8:00 a.m.	***ORAL ONLY***	***Adaptive PMP-based Control for Plug-in Hybrid Electric Vehicles*** *Namwook Kim, Hanyang Univ.*
8:30 a.m.	***2017-01-1252***	***Nonlinear Model Predictive Control of a Power-Split Hybrid Electric Vehicle with Electrochemical Battery Model*** *Ming Cheng, Michigan Technological University; Lei Feng, Mercedes Benz R&D North America; Bo Chen, Michigan Technological University*
9:00 a.m.	***2017-01-1257***	***Physics Model-Based Control Design And Evaluation for Four-Wheel Independent Drive Electric Vehicle Powertrain*** *Haotian Wu, Institute of Electrical and Electronics*
9:30 a.m.	***2017-01-1251***	***Hybrid Electric Vehicle Battery Aging Estimation and Economic Analysis based on Equivalent Consumption Minimization Strategy*** *Bin Zhou, Jeffrey Burl, Michigan Technological Univ; Amir Rezaei, Bosch*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1256***	***Optimal Temperature Trajectory for Maximum Lithium Ion Battery Charge Acceptance*** *Mayank Garg, Christopher Rahn, Pennsylvania State University*
11:00 a.m.	***2017-01-1255***	***Functional Safety and Secure CAN in Motor Control System Design for Electric Vehicles*** *Zhihong Wu, Ke lu, Yuan Zhu, Tongji University; Xiaojun Lei, Shanghai Dajun Technologies Inc.; Liqing Duan, Shanghai G-Pulse Technology Co Ltd; Jian_ning Zhao, Tongji University*

11:30 a.m.	***2017-01-1206***	***Integrating Feedback Control Algorithms with the Lithium-Ion Battery Model to Improve the Robustness of Real Time Power Limit Estimation*** *Zhihong Jin, Johnson Controls Power Solutions; Zhenli Zhang, Perry Wyatt, Johnson Controls*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Controls for Hybrids and Electric Powertrains (Part 2 of 2)

Session Code: ***PFL750***

Room 412 B ***Session Time:*** ***1:30 p.m.***

This session covers powertrain control processes related to achieving stringent market fuel economy, emissions, performance, reliability, and quality demands of hybrid and electric powertrains. Topics include the control, calibration, and diagnostics of the engine, powertrain, and supporting electromechanical subsystems related to energy management.

Organizers - *Dohoy Jung, Univ. of Michigan-Dearborn; Jason McConnell, IAV Automotive Engineering Inc.; Bin Wu, Mercedes Benz R&D North America*

Time	***Paper No.***	***Title***
1:30 p.m.	***2017-01-1253***	***Evaluation of Model Predictive and Conventional Method Based Hybrid Electric Vehicle Supervisory Controllers*** *Somnath Sengupta, Chethan Gururaja, Sushant Hingane, Prajwal A K, KPIT Technologies Ltd; Malay Maniar, Honeywell Turbo India Pvt.Ltd; OndÂ¨ej MikulÃ¡Å¡, Jaroslav Pekar, Honeywell Automotive Software*
2:00 p.m.	***2017-01-1254***	***Online Optimization based Predictive Energy Management Functionality of Plug-In Hybrid Powertrain using Trajectory Planning Methods*** *Raja Sangili Vadamalu, Christian Beidl, VKM TU Darmstadt*
2:30 p.m.	***2017-01-1219***	***Methods for State-Of-Function Algorithm Validation*** *Steven G. Rinaldo, Zhihong Jin, Perry Wyatt, Johnson Controls Inc.*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Emission Control Modeling (Part 4 of 4)

Session Code: ***PFL430***

Room 413 A ***Session Time:*** ***8:00 a.m.***

This technical session addresses exhaust aftertreatment system models, as well as their validation and application. Technologies encompassed include DOC, HC Trap, DPF, GPF, LNT, TWC, SCR, SCRF, ammonia oxidation catalysts, hybrid or combined catalysts, urea-water solution spray dynamics, and mixture non-uniformity. Modeling aspects range from fundamental 3-D models of individual components to system level simulation and optimization.

Organizers - *Christopher Depcik, Univ. of Kansas; Maruthi Devarakonda, General Electric Company; Thomas McKinley, Cummins Inc.; Vincenzo Mulone, Univ. Of Roma Tor Vergata; Achuth Munnannur, Cummins Inc.; Balaji Sukumar, Johnson Matthey ECT*

Chairpersons - *Susan E. Brasmer, Cummins Inc.*

Time	***Paper No.***	***Title***

8:00 a.m.	***2017-01-0979***	***Pressure Drop and Soot Regeneration Characteristics through Hexagonal and Square Cell Diesel Particulate Filters***
		Changpu Zhao, Yayong Zhu, Yaohui Wang, Sirui Huang, Tianjin University
8:30 a.m.	***2017-01-0959***	***Pressure Drop and Soot Accumulation Characteristics Through Diesel Particulate Filters Considering Various Soot and Ash Distribution Types***
		Changpu Zhao, Yayong Zhu, Sirui Huang, Tianjin University

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Advanced Battery Technologies (Part 5 of 6)

Session Code: ***PFL730***

Room 413 B ***Session Time:*** ***8:00 a.m.***

The success of HEV's, PHEV's & EV's is highly dependent on their batteries. This session focuses on advanced battery technologies, including, but not limited to: advanced materials and cell chemistries, battery management systems and controls, modeling, testing, diagnosis and health monitoring, safety, reliability, durability, battery charging, battery economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, module, pack or vehicle levels.

Organizers - *Wayne Cai, General Motors; Yi Ding, RDECOM-TARDEC; James Miller, Argonne National Laboratory; Ramesh Rebba, General Motors LLC*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1204***	***Fast Charging Lithium-Ion Batteries***
		Xiao Yang, Ted Miller, Ford Motor Company
8:30 a.m.	***2017-01-1208***	***Deconstruction of UN38.3 into a Process Flowchart***
		Kristin R. Cooney, Ford Motor Company
9:00 a.m.	***2017-01-1203***	***Development of New Generation Battery Management ECU***
		Takashi Inamoto, DENSO Corporation; Lawrence Alger, DENSO International Europe
9:30 a.m.	***2017-01-1205***	***An Improved Battery Modeling Method Based on Recursive Least Square Algorithm Employing an Optimized Objective Function***
		Letao Zhu, Zechang Sun, Xuezhe Wei, Haifeng Dai, Tongji University Shanghai China
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1210***	***Life Balancingâ€' A Better Way to Balance Large Batteries***
		R. Dyche Anderson, Ford Motor Company; Regan Zane, Utah State University; Gregory Plett, University of Colorado Colorado Springs; Dragan Maksimovic, University of Colorado Boulder; Kandler Smith, National Renewable Energy Laboratory; M. Scott Trimboli, University of Colorado Colorado Springs
11:00 a.m.	***2017-01-1211***	***Modeling and Validation of 12V Lead-Acid Battery for Stop-Start Technology***
		SoDuk Lee, US EPA; Jeff Cherry, Michael Safoutin, US Environmental Protection Agency; Joseph McDonald, US EPA
11:30 a.m.	***2017-01-1207***	***Measurement of Temperature Gradient (dT/dy) and Temperature Response (dT/dt) of a Prismatic Lithium-Ion Pouch Cell with LiFePO₄ Cathode Material***
		Satyam Panchal, Scott Mathewson, Roydon Fraser, Richard Culham, Michael Fowler, University of Waterloo

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Advanced Battery Technologies (Part 6 of 6)

Session Code: ***PFL730***

Room 413 B ***Session Time:*** ***1:30 p.m.***

The success of HEV's, PHEV's & EV's is highly dependent on their batteries. This session focuses on advanced battery technologies, including, but not limited to: advanced materials and cell chemistries, battery management systems and controls, modeling, testing, diagnosis and health monitoring, safety, reliability, durability, battery charging, battery economics/cost reduction, and system integration/optimization. These topics can be addressed at the cell, module, pack or vehicle levels.

Organizers - *Wayne Cai, General Motors; Yi Ding, RDECOM-TARDEC; James Miller, Argonne National Laboratory; Ramesh Rebba, General Motors LLC*

Time	Paper No.	Title
1:30 p.m.	***2017-01-1217***	***Experimental Investigation of AC Pulse Heating Method for NMC Lithium-Ion Battery at Subzero Temperatures***
		Jiangong Zhu, Zechang Sun, Xuezhe Wei, Haifeng Dai, Tongji University
2:00 p.m.	***2017-01-1214***	***Parameter Identification of Battery Pack Considering Cell Inconsistency***
		Jujun Xia, Haifeng Dai, Zechang Sun, Tongji University; Massimo Venturi, EberspÃ¤cher Controls Landau GmbH & Co. K
2:30 p.m.	***2017-01-1215***	***Internal Cell Temperature Measurement and Thermal Modeling of Lithium Ion Cells for Automotive Applications by Means of Electrochemical Impedance Spectroscopy***
		Peter Haussmann, Joachim Melbert, Ruhr-University Bochum
3:00 p.m.	***2017-01-1218***	***Development and Validation of a Reduced Order Model Incorporating a Semi-Empirical Degradation Model for Pouch Type LiFePO₄/Graphite Cells***
		XINCHEN ZHAO, Yalan Bi, Song-Yul Choe, Auburn University
3:30 p.m.	***2017-01-1212***	***Alternatives in Battery Communication Protocols***
		Hong Jia Hong, Jesus Ruiz Sevillano, Clemens Kain, Guenter Hofer, Karl Felber, Wai Keung Chan, Infineon Technologies

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Control System Design & Calibration (Part 4 of 4)

Session Code: ***PFL130***

Room 414 A ***Session Time:*** ***8:00 a.m.***

Separate sub-sessions cover powertrain control, calibration, and system-level optimization processes related to achieving stringent market fuel economy, emissions, performance, reliability, and quality demands. Topics include the control, calibration, and diagnostics of the engine, powertrain, and subsystems related to energy management in conventional and hybrid operation, considering the simultaneous optimization of hardware design parameters and control software calibration parameters.

Organizers - *Xuefei Chen, FCA US LLC; Scott Furry, MathWorks Inc.; Yichao Guo, Ford Motor Co., Ltd.; Kody G. Klindt, IAV Automotive Engineering Inc.; Feilong Liu, Delphi Corp.; Peter J. Maloney, MathWorks; Denise M. Rizzo, US Army TARDEC; Matti Vint, VALEO; Yue-Yun Wang, General Motors LLC*

Time	Paper No.	Title

8:00 a.m.	***2017-01-0603***	***A Calibration Optimizer Tool for Torque Estimation of K0 Clutch in Hybrid Automatic Transmissions*** *Vicente Cuapio Espino, Akshay Bichkar, Joycer D. Osorio, Ford Motor Company*
8:30 a.m.	***2017-01-0599***	***Dynamic Misfire Threshold Determination Based On Zone-Level and Buffer-Level Adaptations for Internal Combustion Engines*** *Yichao Guo, Ford Motor Company*
9:00 a.m.	***2017-01-0601***	***Emissions Modeling of a Light-Duty Diesel Engine for Model-Based Control Design Using Multi-Layer Perceptron Neural Networks*** *Huayi Li, Kenneth Butts, Kevin Zaseck, Toyota Motor North America; Dominic Liao-McPherson, Ilya Kolmanovsky, University of Michigan*
9:30 a.m.	***2017-01-0611***	***Development and Usage of a Continuously Differentiable Heavy Duty Diesel Engine Model Equipped with VGT and EGR*** *Viktor Leek, Kristoffer Ekberg, Lars Eriksson, LinkÃ¶ping University*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0605***	***On the Tradeoffs between Static and Dynamic Adaptive Optimization for an Automotive Application*** *Anthony D'Amato, Yan Wang, Dimitar Filev, Enrique Remes, Ford Motor Company*
11:00 a.m.	***2017-01-0607***	***Data Driven Calibration Approach*** *Nahid Pervez, Ace Koua Kue, Adarsh Appukuttan, John Bogema, Michael Van Nieuwstadt, Ford Motor Company*

The papers in this session are available in SAE Technical Paper Collection, COLL-TP-00577, and also individually. T purchase visit collections.sae.org

Planned by General Powertrain Development / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Driveline Controls

Session Code: ***PFL640***

Room 414 B ***Session Time:*** ***8:00 a.m.***

This session covers transmission and driveline controls. Session will cover topics related to controls hardware, controls software, and controls integration.

Organizers - *Gang Chen, Hussein Dourra, Berthold Martin, FCA US LLC; Craig Renneker, Ford Motor Co., Ltd.*

Time	***Paper No.***	***Title***
8:00 a.m.	***2017-01-1113***	***Constant Speed Control Method of Hydraulic Retarder Based on Fuzzy PID*** *Yulong Lei, Pengxiang Song, Hongpeng Zheng, Yao Fu, ASCL Jilin University; Zhenjie Liu, China North Vehicle Research Institude; Xuanyi Fu, ASCL Jilin University*
8:30 a.m.	***2017-01-1108***	***Research on Optimal Gearshift Strategy for Stepped Automatic Transmission Based on Vehicle Power Demand*** *Yulong Lei, Yao Fu, Ke Liu, Li Xingzhong, Jilin University ASCL; Zhenjie Liu, China North Vehicle Research Institute; Yin Zhang, Xuanyi Fu, Jilin University ASCL*

9:00 a.m.	***2017-01-1109***	***Driveability Improvement with Innovative Toyota 8 Speed Automatic Transmission Control*** *Keisuke Ota, Masami Kondo, Shuntaro Shinohara, Norihiro Tsukamoto, Seiji Masunaga, Ayumu Sagawa, Toyota Motor Corporation*
9:30 a.m.	***2017-01-1111***	***Model-Based Wheel Torque and Backlash Estimation for Drivability Control*** *Marcello Canova, Cristian Rostiti, Ohio State University; Luca D'Avico, Politecnico di Milano; Stephanie Stockar, Penn State University; Gang Chen, Michael Prucka, Hussein Dourra, FCA US LLC*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-1112***	***Self-Tuning PID Design for Slip Control of Wedge Clutches*** *Jian yao, General Motors; Li Chen, Ding Zhao Jr, Shanghai Jiao Tong University; Chunhao Lee, Ying Huang, General Motors LLC; Yin Chengliang, Shanghai Jiao Tong University*
11:00 a.m.	***2017-01-1110***	***Novel Shift Control without Clutch Slip in Hybrid Transmissions*** *Muammer Yolga, Markus Bachinger, AVL LIST GmbH*
11:30 a.m.	***2017-01-1107***	***Implementation of an Open-loop Controller to Design the Longitudinal Vehicle Dynamics in Passenger Cars*** *Christoph Andre Malonga Makosi, Daimler AG; Stephan Rinderknecht, Technical University of Darmstadt; Ralf Binz, Frank Uphaus, Frank Kirschbaum, Daimler AG*

Planned by Transmission and Driveline Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Powertrain Actuators and Sensors

Session Code: ***PFL560***

Room 414 B ***Session Time:*** ***1:30 p.m.***

Topics cover actuator and sensor mechanisms, devices, and systems; and the impact and control of such actuation and sensing systems on Powertrain thermodynamics, combustion, fuel economy, emissions, and performance.

Organizers - *Jaal B. Ghandhi, Univ. of Wisconsin Madison; Leonid Tartakovsky, Technion Israel Inst. of Technology; Bryon Wasacz, Fiat Chrysler Automobiles; Andrew M. Williams, Loughborough Univ.*

Time	***Paper No.***	***Title***
2:00 p.m.	***2017-01-1066***	***Transient Valve Temperature Measurement (TVTM)*** *Christoph Beerens, Alexander Mueller, MAHLE International GmbH; Kimm Karrip, MAHLE Engine Components USA, Inc.*
2:30 p.m.	***2017-01-1067***	***Analysis of Cylinder Pressure Measurement Accuracy for Internal Combustion Engine Control*** *Xiaoguo Storm, Heikki J. Salminen, Reino Virrankoski, Seppo Niemi, University of Vaasa; Jari Hyvonen, Wartsila Finland Oy*
3:30 p.m.	***2017-01-1068***	***Utilization of Turbocharger Speed Data to Increase Engine Power and Improve Air Path Control Strategy and Diagnostics*** *Jonathan Tigelaar, Krista Jaquet, David Cox, Albert Peter, TE Connectivity / JAQUET AG*

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Alternative and Advanced Fuels (Part 2 of 2)

Session Code: ***PFL330***

Room 415 A ***Session Time:*** ***8:00 a.m.***

This session includes four papers related to spark-ignition engines and their fuels and five papers related to the processes of compression ignition combustion of different fuels.

Organizers - *Casey Maxwell Allen, Marquette Univ.; Mebougna Drabo, Alabama A & M University; George Karavalakis, University of California - Merced; Paul Richards; Toby Rockstroh, Argonne National Laboratory; Elisa Toulson, Michigan State University*

Time	Paper No.	Title
8:00 a.m.	2017-01-0876	**A Comparative Experimental Study On Different Methods of Using Waste Cooking Oil As Fuel in a Compression Ignition Engine** *Senthil Kumar Masimalai, MIT, Anna University; Jai Kumar Mayakrishnan, Hindustan University*
8:30 a.m.	2017-01-0873	**A Comprehensive Assessment On the Combined Effect of Thermal Barrier Coating and Emulsification Techniques on Engine Behavior of a Mahua Oil Based CI Engine** *Senthilkumar Masimalai, MIT, Anna University; Jai Kumar Mayakrishnan, Hindustan University; Natraj Ganesan, MIT, Anna University*
9:00 a.m.	2017-01-0875	**Performance Evaluation -Combustion, Emissions and Vibrations- of n-Butanol Binary Mixture with ULSD in an Indirect Injection Engine** *Valentin Soloiu, Jose Moncada, Martin Muinos, Aliyah Knowles, Remi Gaubert, Thomas Beyerl, Gustavo Molina, Georgia Southern University*
9:30 a.m.	2017-01-0869	**Performance and Emissions of a Heavy-Duty Common Rail Direct Injection Engine fueled with Philippine Coconut Methyl Ester (CME) - Diesel Blends** *Job Immanuel Encarnacion, Edwin Quiros, University of the Philippines*
10:00 a.m.		**BREAK**
10:30 a.m.	2017-01-0866	**LPG as an Alternative Fuel for Philippine Jeepneys - A Preliminary Study** *Edwin N. Quiros, Karl B.N. Vergel, Ernesto B. Abaya, University of the Philippines*
11:00 a.m.	2017-01-0871	**Lubricity of Light-End Fuels with Commercial Diesel Lubricity Additives** *Alexander K. Voice, Tom Tzanetakis, Michael Traver, Aramco Research Center*
11:30 a.m.	2017-01-0861	**A New-Concept Gasoline Pump Injector (GPI) for Motorcycle** *Balasubramanian N., Karthick Durairaj, Jayabalan Sethuraman, Stanadyne India Pvt. Ltd.*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Thursday, April 6

CI & SI Power Cylinder Systems (Part 2 of 2)

Session Code: ***PFL530***

Room 415 B ***Session Time:*** ***8:00 a.m.***

This session covers the Power Cylinder: piston, piston rings, piston pins, and connecting rods. The papers include information on reducing friction and increasing fuel economy, improving durability by understanding wear, and decreasing oil consumption and blow-by.

Organizers - *Dan Richardson, Yong-Ching Chen, Cummins Inc.; Leonid Tartakovsky, Technion Israel Inst. of Technology; William D. McNulty, Cummins Inc.*

Chairpersons - *Dan Richardson, Cummins; Dave McNulty, Cummins Inc*

Time	Paper No.	Title
8:00 a.m.	2017-01-1048	**Lower Cost Automotive Piston from 2124/SiC/25p Metal-Matrix Composite** *Javad Falsafi, Malgorzata Rosochowska, Prashant Jadhav, Advanced Forming Research Centre; David Tricker, Materion AMC*
8:30 a.m.	2017-01-1046	**Heat Loss Analysis of a Steel Piston and a YSZ Coated Piston in a Heavy-Duty Diesel Engine Using Phosphor Thermometry Measurements** *Christian Binder, Scania CV AB; Fahed Abou Nada, Mattias Richter, Lund University; Andreas Cronhjort, KTH Royal Institute of Technology; Daniel Norling, Scania CV AB*
9:00 a.m.	2017-01-1042	**An Introduction to How Low Speed Pre Ignition Affects Engine Components** *Eric J. Passow, Mahle; Paras Sethi, Max Maschewske, MAHLE Industries Inc; Jason Bieneman, Kimm Karrip, Mahle Engine Components USA; Paul Truckel, MAHLE Powertrain LLC*
9:30 a.m.	2017-01-0800	**Investigation and Analysis of Wear in a 3.6L V6 Gasoline Engine: Phase I - Use of Radioactive Tracer Technology** *Varun Gauba, Tushar Bera, Jannik Reitz, Shell Global Solutions (US) Inc.; Gregory Hansen, Peter Lee, Craig Wileman, Southwest Research Institute; Edward Nelson, Shell Global Solutions (US) Inc.*

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Valvetrain, including VVA

Session Code: ***PFL570***

Room 415 B ***Session Time:*** ***1:30 p.m.***

The design, development, and testing of Valve Train and Variable Valve Actuation mechanisms, devices, and systems; and the impact and control of such systems on thermodynamics, combustion, fuel economy, emissions, noise and vibration, and performance.

Organizers - *Thomas Peter Howell, Jacobs Vehicle Systems Inc.; Timothy Kunz, Delphi Automotive Systems; Leonid Tartakovsky, Technion Israel Inst. of Technology; James Robert Westbrook, FCA US LLC*

Time	Paper No.	Title
1:30 p.m.	2017-01-1069	**Combustion Analysis on a Variable Valve Actuation Spark Ignition Engine Operating With E22 and E100** *Igor Trevas, Fiat Chrysler Automobiles; Adm JosÃ©baeta, Federal Univ of Minas Gerais; Charles Pimenta, Heder Fernandes, Matheus Carvalho, Fiat Chrysler Automobiles; Raphael Montemor, FEV Latin America*
2:00 p.m.	2017-01-1073	**Physically Motivated Model for Efficient Dynamic Simulation of Chain Tensioners with Labyrinth Seals** *Robert Huber, Jan Clauberg, Technische Universitaet Muenchen*

Planned by New Engines, Components, Actuators and Sensors / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Advanced Vehicle Technology Competitions

Session Code: ***PFL760***

Room 420 A ***Session Time:*** ***ALL DAY***

The EcoCAR 4 student vehicle competition, sponsored by General Motors and the U.S. Department of Energy, tasks university teams with designing, implementing and refining advanced technology powertrains into a conventional Chevrolet Camaro. This session presents yearly results from teams in the competition, highlighting the entire EcoCAR vehicle development process and team accomplishments.

Organizers - *R. Jesse Alley, Argonne National Laboratory; Michael Royce; Jonathan Moore, Trevor Crain, Argonne National Laboratory; Saeed Siavoshani, Siemens PLM Software*

Time	Paper No.	Title
8:00 a.m.	2017-01-1263	**Testing and Validation of a Belted Alternator System for a Post-Transmission Parallel PHEV for the EcoCAR 3 Competition** *Dennis Kibalama, Andrew Huster, Arjun Khanna, Aditya Modak, Margaret Yatsko, Gregory Jankord, Shawn Midlam-Mohler, The Ohio State University*
8:30 a.m.	2017-01-1259	**Simulation and Bench Testing of a GM 5.3L V8 Engine** *Eduardo D. Marquez, Virginia Tech.; John Stevenson, Ethan Dietrich, Douglas Nelson, Christopher Flake, Alexander Neblett, Samuel Reinsel, Virginia Tech*
9:00 a.m.	2017-01-1262	**Investigation of Vehicle Speed Prediction from Neural Network Fit of Real World Driving Data for Improved Engine On/Off Control of the EcoCAR3 Hybrid Camaro** *David Baker, Zachary Asher, Thomas Bradley, Colorado State University*
9:30 a.m.	2017-01-1258	**Extended Range Electric Vehicle Powertrain Simulation, and Comparison with Consideration of Fuel Cell and Metal-Air Battery** *John Catton, Caixia Wang, Steven Sherman, Michael Fowler, Roydon Fraser, University of Waterloo*
10:00 a.m.		**BREAK**
10:30 a.m.	2017-01-1260	**Solar Prototype for Shell-Eco Marathon Race** *Gianmarco Galmarini, Stefano Dell'Agostino, Massimiliano Gobbi, Giampiero Mastinu, Politecnico di Milano*
11:00 a.m.	2017-01-1261	**Implementation of Project Management and Knowledge Management Practices in Activities of a Clean Snowmobile Competition Team** *Mark Woodland, Dillon Savage, Patrick Paulus, Aaron Eliason, Cade Smith, Dan Cordon, Steven W. Beyerlein, University of Idaho*

Planned by Hybrid and Electric Powertrains Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Fuel Injection and Sprays (Part 8 of 8)

Session Code: ***PFL320***

Room 420 A ***Session Time:*** ***1:30 p.m.***

This session is devoted to experimental and computational work in the area of fuel injection systems and sprays. Topics include: spray characterization, cavitation, multi-phase jet modeling, CFD models for spray processes, wall films and impingement, hydraulic circuit analysis, and dissolved gas effects. Studies of both gasoline and diesel fuel sprays and fuel injection equipment are encouraged.

Organizers - *Tarek M. Abdel-Salam, East Carolina University; Essam El-Hannouny, Argonne National Laboratory; Shyam Menon, Louisiana State University; Michele Battistoni, Universita degli Studi di Perugia; Julien Manin, Sandia National Laboratories*

Chairpersons - *Roberto Torelli, Noah Van Dam, Argonne National Laboratory*

Time	Paper No.	Title
1:30 p.m.	2017-01-0812	**Development and Experimental Validation of a Fast Spray Ignition Model for Diesel Engines Using Insights from CFD Spray Calculations** *Christophe Barro, ETH Zurich / Vir2sense; Adam Lucjan, ETH Zurich; Zhi Li, Liebherr Machines Bulle SA; Panagiotis Kyrtatos, ETH Zurich / Vir2sense; Sushant Pandurangi, ETH Zurich; Yuri M. Wright, ETH Zurich/Combustion+FlowSolutionsGmbH; Konstantinos Boulouchos, ETH Zurich*
2:00 p.m.	2017-01-0814	**Development and Verification of Reduced-Order Model for Diesel Spray Penetration and Spreading during Wall Impingement** *Daniel Ruth, Jacqueline O'Connor, Pennsylvania State University*
2:30 p.m.	2017-01-0843	**Characterization of Spray Evaporation and Mixing Using Blends of Commercial Gasoline and Diesel Fuels in Engine-Like Conditions** *Jose Pastor, Jose M Garcia-Oliver, Antonio Garcia, Varun Reddy Nareddy, Universitat Politecnica de Valencia*
3:00 p.m.	2017-01-0813	**Selection of Swirl Ratio in Diesel Engines Based on Droplet Trajectory Analysis** *Yanzhe Sun, Kai Sun, Zhen Lu, Tianyou Wang, Mengqiu Jia, Tianjin University*
3:30 p.m.	2017-01-0826	**A New Validation of Spray Penetration Models for Modern Heavy Duty Diesel Fuel Injectors** *Russell P. Fitzgerald, Christopher Gehrke, Kenth Svensson, Glen Martin, Caterpillar Inc.*

Planned by Fuels and Lubricants / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Advances in NOx Reduction Technology (Part 2 of 2)

Session Code: ***PFL424***

Room 420 B ***Session Time:*** ***8:00 a.m.***

These sessions will focus on â€˜Advances in NOx Reduction Technologyâ€™. The topics covered will include: new materials for Lean NOx Traps (LNT) and Selective Catalytic Reduction (SCR); system integration and durability; advances in NOx catalyst substrates, novel reductants and mixing designs.

Organizers - *Brad Adelman, Navistar Inc.; Danan Dou, John Deere Product Engineering Center; Magdi K. Khair, Magdiesel Technologies; Rahul Mital, General Motors LLC; Shyam Santhanam, Navistar Inc.*

Time	Paper No.	Title
8:00 a.m.	2017-01-0941	**Aftertreatment Systems to Meet NSVI, BSVI Regulation Limits** *Liu Yang, Johnson Matthey Catalysts; Balaji Sukumar, Johnson Matthey ECT; Mojghan Naseri, Penelope Markatou, Johnson Matthey Inc.; Sougato Chatterjee, Johnson Matthey ECT*
8:30 a.m.	2017-01-0947	**Investigation of SCR Catalysts for Marine Diesel Applications** *Athanasios G. Konstandopoulos, CERTH/CPERI and Aristotle University; Dimitrios Zarvalis, Leonidas Chasapidis, Danis Deloglou, Nickolas Vlachos, CERTH/CPERI; Adam Kotrba, Ginette Anderson, Tenneco Inc*
9:00 a.m.	2017-01-0935	**Twin-LNT System for Advanced Diesel Exhaust Gas Aftertreatment** *Christoph Boerensen, Dirk Roemer, Christian Nederlof, Evgeny Smirnov, Frank Linzen, Felix Goebel, Brendan Carberry, Ford Motor Company*

9:30 a.m.	***2017-01-0942***	***The Effects of CO, C2H4, and H2O on the NOx Storage Performance of Low Temperature NOx Adsorbers for Diesel Applications*** *Joseph R. Theis, Christine Lambert, Ford Motor Company*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0946***	***Impact of Hydrothermal Aging on the Formation and Decomposition of Ammonium Nitrate on a Cu/zeolite SCR Catalyst*** *Nathan Ottinger, Yuanzhou Xi, Christopher Keturakis, Z. Gerald Liu, Cummins Emission Solutions*
11:00 a.m.	***2017-01-0940***	***Performance Studies and Correlation between Vehicle- and Rapid-Aged Commercial Lean NOx Trap Catalysts*** *Jesus Emmanuel De Abreu Goes, Volvo Car Corporation; Louise Olsson, Chalmers University of Technology; Malin Berggrund, Annika Kristoffersson, Lars Gustafson, Mikael Hicks, Volvo Car Corporation*
11:30 a.m.	***2017-01-0939***	***Effect of Transition Metal Ion Properties on the Catalytic Functions and Sulfation Behavior of Zeolite-Based SCR Catalysts*** *Ashok Kumar, Krishna Kamasamudram, Neal Currier, Aleksey Yezerets, Cummins Inc.*

Planned by Exhaust Aftertreatment and Emissions Committee / Powertrain Fuels and Lubricants Activity

Thursday, April 6

Technical Expert Panel Discussion - Secondary Organic Aerosol Formation from Mobile Sources: The Effects of Engine Technology and Type, Fuel Formulation, and Aftertreatment

Session Code: ***PFL400***

Room 420 B ***Session Time:*** ***1:30 p.m.***

Organizers - *George Karavalakis, University Of California Riverside*

Moderators - *Aron D. Butler, US Environmental Protection Agency*

Panelists - *George Karavalakis, University Of California Riverside; Jorma Keskinen, Tampere Univ. of Technology; Simone Pieber, Paul Scherrer Institute; Allen Robinson, Carnegie Mellon Univ.;*

Thursday, April 6

Thermal System Components

Session Code: ***HX101***

Room 430 B ***Session Time:*** ***8:00 a.m.***

Thermal Management represents one of the key aspects of the vehicle development. It ensures that the temperatures in the underhood and underbody areas are in desired ranges, that thermal systems operate as designed, and that no component operation is at risk due to excessive temperatures. This session covers the design of thermal components and systems and their vehicle integration.

Organizers - *Ronald Semel, Ford Motor Company; Gursaran D. Mathur, CalsonicKansei North America Inc.; Andrew Sutherland, BorgWarner Inc.; Alaa El-Sharkawy, FCA US LLC*

Time	***Paper No.***	***Title***

8:00 a.m.	***2017-01-0126***	***Control of a Thermoelectric Cooling System for Vehicle Components and Payloads - Theory and Test*** *Joshua W. Finn, Mercer Engineering Research Center; John R. Wagner, Clemson University*
9:00 a.m.	***2017-01-0120***	***Ejector Energy-Saving Technology for Mobile Air Conditioning Systems*** *Yoichiro Kawamoto, Gota Ogata, DENSO Corporation; Zhiwei Shan, DENSO International America, Inc.*
9:30 a.m.	***2017-01-0125***	***A Novel Tank Heater Based on PTC (Positive Temperature Coefficient) Plastic Nanomaterial*** *Marco Pizzi, Mauro Zorzetto, Alberto Barbano, Piercarlo Merlano, Luca Vercellotti, Eltek*
10:00 a.m.		***BREAK***
10:30 a.m.	***2017-01-0123***	***An Experimental Study of a Waste Heat Recovery System Connected to a Diesel-Gen-Set*** *Saiful Bari, Univ. of South Australia*

Planned by Thermal Management Activity / EMB Land and Sea Group

Thursday, April 6

Energy Efficiency of Thermal Systems (Part 2 of 2)

Session Code: ***HX103***

Room 430 B ***Session Time:*** ***11:00 a.m.***

Proper thermal management can significantly contribute to overall system energy efficiency. This session highlights the latest developments in thermal management energy efficiency.

Organizers - *Ronald Semel, Ford Motor Company; Gursaran D. Mathur, CalsonicKansei North America Inc.; Jeffrey Bozeman, General Motors LLC; Andrew Sutherland, BorgWarner Inc.*

Time	***Paper No.***	***Title***
11:00 a.m.	***2017-01-0158***	***A Study of Thermoacoustic Refrigerator*** *Masaaki Nakamura, Hino Motors, Ltd.; Koichi Machida, Kiyohiro Shimokawa, Hino Motors Ltd*
11:30 a.m.	***2017-01-0160***	***The TEG Hot-End Heat Capacity's Effect on the Power Output Stability for Harvesting Automobile Exhaust Energy*** *Longjie Xiao, Tianming He, Wuhan University of Technology; Gangfeng Tan, Wuhan Univ. of Tech / Virginia Tech; Bo Huang, Xianyao Ping, Wuhan University of Technology*

Planned by Thermal Management Activity / EMB Land and Sea Group

Thursday, April 6

Climate Control (Part 3 of 3)

Session Code: ***HX104***

Room 430 B ***Session Time:*** ***1:30 p.m.***

Climate control is a defining vehicle attribute and is associated with brand image. Thermal performance and quality of climate control are both critical to customer satisfaction. The system has strong design interaction with other vehicle systems, while its primary objective is to deliver thermal comfort and occupant safety with low energy consumption. Localized Comfort, Secondary Fluids, Air Quality, Controls, System Sizing and HVAC consumer interface are just a few of the recent advances.

Organizers - *Bashar AbdulNour, Ford Motor Company; Jeffrey Bozeman, General Motors LLC; Hector Cano, Bergstrom Inc.; Jie Zeng, Denso; Tao Zhan, California Air Resources Board*

Time	Paper No.	Title
1:30 p.m.	2017-01-0161	**Research on the Application of Micro-Channel Evaporator in R134a Roof-Top Bus Air Conditioner** *Dandong Wang, Cichong Liu, Jiangping Chen, Shanghai Jiaotong University*
2:00 p.m.	2017-01-0171	**Air Conditioning System Performance and Vehicle Fuel Economy Trade-Offs for a Hybrid Electric Vehicle** *Quansheng Zhang, Yan Meng, Christopher Greiner, Ciro Soto, William Schwartz, Mark Jennings, Ford Motor Company*
2:30 p.m.	2017-01-0129	**High-Precision Modeling of Heat Exchanger Core on Vehicle Engine Room Airflow Analysis** *Sinya Miura, Takashi YASUDA, DENSO Corporation*
3:00 p.m.	2017-01-0182	**Cool Down Analysis of an HVAC System Using Multi-Zone Cabin Approach** *Gautam Peri, Saravanan Sambandan, S. Sathish Kumar, FCA Engineering India Pvt Ltd*
3:30 p.m.	2017-01-0179	**Robust 1D Modelling for Automotive HVAC Warmup Prediction Using DFSS Approach** *Saravanan Sambandan, FCA Engineering India Pvt Ltd.; Manuel Valencia, FCA US LLC; Sathish Kumar S, FCA Engineering India Pvt Ltd.*

Planned by Thermal Management Activity / EMB Land and Sea Group

Thursday, April 6

Banquet: Featured Speaker

Session Code: ***KEY301***

Room Grand Riverview Ballroom B ***Session Time:*** ***6:00 p.m.***

Time	Paper No.	Title
	ORAL ONLY	**Learn more about the Featured Speaker** *Four important megatrends shaping the environment and driving Fordâ€™s thinking around mobility are urbanization, rapid growth of the global middle class, air quality and changing consumer attitudes. Given the level of disruptive change that weâ€™re all facing, it is clear that business needs to adapt to deliver automotive leadership in tomorrowâ€™s world. In this keynote speech, Raj Nair, Fordâ€™s executive vice president, Product Development and chief technical officer, will share how Ford is driving sustainability through innovation.* *Raj Nair, Ford Motor Company*

Thursday, April 6

Leadership Summit Thursday

Session Code: ***LS300***

Room The Exchange ***Session Time:*** ***9:15 a.m.***

Time	Paper No.	Title

9:15 a.m.	***ORAL ONLY***	***Contemporary Panel: How, What and if You Will Drive in the Next Decade*** ***Moderators -*** *Lindsay Brooke, SAE International* ***Panelists -*** *Bob Fascetti, Ford Motor Company; Robert Lee, FCA US LLC; David Moseley, Lucid Motors; Daniel Nicholson, General Motors LLC; Marc Winterhoff, Roland Berger Strategy Consultants;* *Meet the Panel*
10:30 a.m.	***ORAL ONLY***	***Roundtable: Liability of Technology*** ***Moderators -*** *Thomas P. Branigan, Bowman & Brooke* ***Panelists -*** *Jennifer Dukarski, Butzel Long; Lawrence Nolan, Cooley Law School; Bryant Walker Smith, University of South Carolina; Brian S. Westenberg, Miller Canfield Paddock & Stone PLC;* *Meet the Panel*
11:45 a.m.	***ORAL ONLY***	***Roundtable: Executive Conclusion*** ***Moderators -*** *Douglas Patton, DENSO International America Inc.* ***Panelists -*** *Jeffrey C. Klei, Continental Automotive; Jon Lauckner, General Motors Company; Kenneth Edward Washington, Ford Motor Company; Harald Wester, FCA Group;* *Meet the Panel*

Thursday, April 6

Tech Hub Thursday Afternoon

Session Code: ***TH300***

Room The Exchange ***Session Time:*** ***1:00 p.m.***

Time	***Paper No.***	***Title***
1:00 p.m.	***ORAL ONLY***	***Designing in the Age of Automated Vehicles*** *Paul Snyder, College for Creative Studies*
1:30 p.m.	***ORAL ONLY***	***The Power of Provocations and Fostering Creative Cultures*** *How will we move people, things, spaces and together in the coming age of automobility? Inspired and informed by human-centered design, IDEO visualizes what it might be like to live in a not-so-distant future powered by autonomous vehicles and connected mobility services. Danny Stillion, Partner and Executive Design Director at IDEO, will share the design process, challenges, and insights associated with creating provocative points of view.* *Danny Stillion, IDEO*
2:00 p.m.		***BREAK***
2:15 p.m.	***ORAL ONLY***	***Using ESP (Early Synthetic Prototyping) on your customer to shape vehicle design.*** *The US Army is working towards Soldiers (versus generals and engineers) designing vehicles in a physics-based game. Soldiers are given a mission set to accomplish, a virtual budget, and a "goody shack". Similarly, in commercial automotive, a game could be created where customers could optimize their budget-constrained transportation options for the day as a game. This might directly provide the monetary utility of various options and enable a new way to partner engineers and customer.* *Robert Smith, TARDEC*

2:45 p.m.	***ORAL ONLY***	***5G-The Next Frontier***
		Rob Topol, Intel
3:15 p.m.	***ORAL ONLY***	***The Art of the Possible: Boron Nitride Nanotubes***
		Boron Nitride Nanotubes (BNNTs) are made out of alternating atoms of boron and nitrogen. They are 10,000 times smaller than a human hair. How can something so small have such great promise in creating ultralightweight multifunctional structural materials for vehicles or helping kill cancer cells? It is BNNTsâ€™ unique material properties and morphology. For aeronautical and space applications, BNNTs have utility in high strength, modulus and tough composites, lightweight armor, wire insulation, thermal protection and management, radiation shielding, and reduced weight engine components. Owing to the thermal oxidation stability, anti-penetrant and wear resistant properties of BNNTs, their fibers, yarns, and mats could be used as high hardness and toughening layers for brake pads and abrasive automotive components. BNNTs and their nanocomposites offer anti-corrosive properties as well. BNNTs also have the capability to act as a hydrogen storage material. As alternative fuel sources become necessary, BNNTs may enable solid-state hydrogen based fuel technology in the automotive industry. This presentation discusses the synthesis and potential applications of boron nitride nanotubes.
		Catharine Fay, NASA
3:45 p.m.		***BREAK***

Thursday, April 6

Knowledge Bar - Thursday

Session Code: ***KB300***

Room The Knowledge Bar ***Session Time:*** ***2:00 p.m.***

Time	***Paper No.***	***Title***
2:00 p.m.	***ORAL ONLY***	***Xtreme Fast Charging (at 350kW)***
		Ted Bohn, Argonne National Laboratory
2:30 p.m.	***ORAL ONLY***	***Wireless Charging***
		Burak Ozpineci, Oak Ridge National Laboratory
3:00 p.m.	***ORAL ONLY***	***Vehicle Assessment Analytics***
		Paramsothy Jayakumar, US Army TARDEC

Thursday, April 6

Learning Lab - Thursday

Session Code: ***LL300***

Room The Learning Lab ***Session Time:*** ***ALL DAY***

Time	***Paper No.***	***Title***
10:00 a.m.	***ORAL ONLY***	***Reid Railton - Man of Speed***
		Karl Ludvigsen, Partner, Ludvigsen Partners

12:00 p.m.	***ORAL ONLY***	***The New Generation of Low Extractable Evonik Multilayer Tubing for Gasoline Fuel Lines*** *Olivier Farges, Evonik Resource Efficiency GmbH; Joe Debaene, Evonik High Performance Polymers*
1:00 p.m.	***ORAL ONLY***	***The Hansen Variable-Displacement Supercharger: Challenging Turbo-Charger Dominance with Breakthrough Acceleration and Competitive Fuel Economy.*** *Craig Hansen, Paul Cross, Hansen Engine Corp.*
1:30 p.m.	***ORAL ONLY***	***HMI*** *Doua Vang, DENSO International America Inc.*
2:00 p.m.	***ORAL ONLY***	***Engineering for New Business Model through Innovation*** *James Patrick Holland, Ford Motor Company*
3:00 p.m.	***ORAL ONLY***	***GAMIC Winners*** *Winners of the GAMIC Challenge from four categories of innovation will present their products* *GAMIC Winners*

To: OTAQ Materials[OTAQMaterials@epa.gov]; Charmley, William[charmley.william@epa.gov]; Bunker, Byron[bunker.byron@epa.gov]; Simon, Karl[Simon.Karl@epa.gov]; Orlin, David[Orlin.David@epa.gov]; Kataoka, Mark[Kataoka.Mark@epa.gov]; Spears, Matthew[spears.matthew@epa.gov]
From: Moulis, Charles
Sent: Mon 2/13/2017 10:12:14 PM
Subject: Summary of Phase 2 Petitions for Tuesday meeting
Summary of Phase 2 Petitions.docx

Attached are materials for the 1:00 meeting with Chris on the Phase 2 petitions.

To: Charmley, William[charmley.william@epa.gov]; Spears, Matthew[spears.matthew@epa.gov]; Moulis, Charles[moulis.charles@epa.gov]; Kataoka, Mark[Kataoka.Mark@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]
From: Orlin, David
Sent: Fri 2/10/2017 9:01:17 PM
Subject: Re: Phase 2 Petition Update

Just checking in in advance on this meeting. Mark and I are happy to talk from the one-pager we did for Sarah and I am thinking that is all the paper we need? Are there specific topics not covered on the one-pager you'd like us to discuss or is there anything in particular we need to discuss among ourselves before Tuesday Ex. 5 - Deliberative Process, Attorney Client

Ex. 5 - Deliberative Process, Attorney Client

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

From: Stewart, Gwen on behalf of Grundler, Christopher
Sent: Thursday, February 9, 2017 12:07 PM
To: Charmley, William; Spears, Matthew; Moulis, Charles; Hengst, Benjamin; Sutton, Tia; Orlin, David; Kataoka, Mark
Cc: Iffland, JoNell; Gonzalez, Gail
Subject: Phase 2 Petition Update
When: Tuesday, February 14, 2017 1:00 PM-2:00 PM.
Where: RM. 6520 DC/RM. C-174 DOD AA

MEETING REQUEST:

OTAQ MEETING REQUEST FORM

-

Requesting Meeting/Conference Call with: **Christopher Grundler**

Send form to: Gwen Stewart – 202 564-1682

Date of this Request: February 8, 2017

Point of Contact (Name/Number): Chuck Moulis/JoNell Iffland

Title of Meeting: Phase 2 Petition Update

Purpose of Meeting: Update Chris on the petitions related to the HD Phase 2 rule.

Priority Status: Critical or time sensitive ---__X____ Less Immediate _____

Last possible date for meeting: February 22

If the meeting is critical, please explain why: Approaching deadlines for certain petition actions

Location of Meeting: Chris's Office

Length of Meeting: 1 hour

Key Participants: (List all who need to be notified of the meeting)

Office/Organization Email Address

Number	
Bill Charmley	charmley.william@epa.gov
Matt Spears	spears.matthew@epa.gov
Chuck Moulis	moulis.charles@epa.gov
Ben Hengst	hengst.benjamin@epa.gov
Tia Sutton	sutton.tia@epa.gov
David Orlin	orlin.david@epa.gov
Mark Kataoka	kataoka.mark@epa.gov

To: Charmley, William[charmley.william@epa.gov]; Spears, Matthew[spears.matthew@epa.gov]
From: Moulis, Charles
Sent: Fri 2/10/2017 3:34:10 PM
Subject: Draft Materials for Discussion with Chris on Phase 2 Petitions
Summary of Phase 2 Petitions.docx

Attached is a one-pager on the petitions, with OGC's more detailed discussion appended. Any comments?

To: Charmley, William[charmley.william@epa.gov]
Cc: Olechiw, Michael[olechiw.michael@epa.gov]; Wysor, Tad[wysor.tad@epa.gov]
From: Moran, Robin
Sent: Wed 2/8/2017 1:14:45 PM
Subject: RE: Final copy of QFRs from the September cafe hearing
EPA_NHTSA QFRs2017-01-06-155617.pdf
QFRs EPA+NHTSA Responses Final 010517.pdf

Here you go.

-----Original Message-----
From: Charmley, William
Sent: Wednesday, February 08, 2017 8:08 AM
To: Moran, Robin <moran.robin@epa.gov>
Cc: Olechiw, Michael <olechiw.michael@epa.gov>; Wysor, Tad <wysor.tad@epa.gov>
Subject: Final copy of QFRs from the September cafe hearing

Robin and tad

Did we ever get a copy of the final, signed qfr response that Janet and Paul h at NHTSA signed?

I will like to get a copy for my electronic files

Thanks
Bill

To: Charmley, William[charmley.william@epa.gov]; Moulis, Charles[moulis.charles@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]
Cc: Kataoka, Mark[Kataoka.Mark@epa.gov]
From: Orlin, David
Sent: Mon 2/6/2017 8:31:39 PM
Subject: ICYMI-- trade press article on Phase 2 HD litigation

Below is an article from Inside EPA on the litigation on the HD rule. Has some interesting quotes from industry sources (e.g., suggesting that they expect EPA to settle with TTMA and that the OEMs might object if EPA does not then adjust the standards to reflect the CO2 reductions being foregone). Also mentions the Racing challenge and Chris' talk to SAE.

Trailer Makers Detail Narrow Challenge To EPA Heavy-Duty Truck GHG Rule

February 06, 2017

The Truck Trailer Manufacturers Association (TTMA) says it plans to challenge only the trailer-related provisions of EPA's phase two medium- and heavy-duty truck greenhouse gas rule finalized last year, rather than pursue a broad challenge to the overall rule.

The group outlines the scope of its challenge in a Feb. 2 filing responding to Jan. 23 motions by eight states and environmental groups to intervene on EPA's behalf and defend the rule. That effort appeared to be aimed at defending the trailer provisions in the event the Trump administration declines to do so, though it could also be an attempt to preserve the overall stringency of the rule if the trailer portion is removed. The court has not yet ruled on the intervenor motions.

One industry source says groups that back the rule's engine and vehicle provisions do not intend to become involved in the litigation and expect the new administration and TTMA to reach a settlement. However, that participation plan could change if the stringency of the heavy-duty truck portion of the rule is not softened to account for whatever may be lost from trailers.

TTMA says in the filing that it is not taking a position on the effort to intervene while noting it "challenges only the provisions that pertain to trailers, and trailers do not have engines." The filing notes that the challenged provisions require trailers hauled by heavy-duty tractors to have aerodynamic additions that, the group says, will achieve little if any GHG or fuel economy benefit because the added weight of the equipment would require loads to be lighter and result in the need for additional trucks to transport the same amount of goods.

"Accordingly, Movants may have no interest in, or suffer injury from, TTMA's challenge to the trailer requirements, and they have not articulated any such injury," the filing says.

One TTMA source says that the group is not concerned that separate, already-existing rules in California regulating trailers will impose two different standards because the California rule requires "the fleet to buy the equipment needed to comply and not . . . the trailer manufacturers to sell unneeded equipment."

The source adds that the group will argue that EPA lacks Clean Air Act authority to regulate trailers as a "motor vehicle" -- a longstanding claim that the Obama EPA rejected, through the Trump EPA has not weighed in on the matter.

Racing Challenge

Joining TTMA in the Dec. 28 challenge to the EPA rule is the Racing Enthusiasts & Suppliers Coalition, a group that is expected to argue that EPA's removal of language from a draft version of the rule -- which critics warned could affect amateur racers -- did not go far enough to satisfy their concerns.

Offering support to this group is Sen. Richard Burr (R-NC), who introduced Jan. 24 legislation, S. 203, to "stop EPA from cracking down on amateur race car mechanics and hobbyists." Rep. Patrick McHenry (R-NC) Jan. 6 introduced a companion version in the House, H.R. 350.

Burr's office said in a statement: "In 2015, for the first time ever, the Obama administration proposed a rule that would have enabled the EPA to fine amateur motorsports enthusiasts for converting their personal vehicles to racecars. This proposal ran counter to nearly a half century of clear congressional intent under the Clean Air Act. Thankfully, the rulemaking was removed; however, the EPA still views the practice of concerting vehicles into racecars as unlawful. The RPM Act will ensure that no administration will ever be able to overstep its regulatory powers in this area."

Lawyers representing the racing group did not respond to repeated requests for comment, so the exact scope of its challenge remains unclear. They have a Feb. 22 deadline to submit a statement

of issues.

EPA last April announced that it removed the provision in the then-proposed truck rule that addressed "tampering" with vehicles and had outraged the racing enthusiasts. In a statement posted to its website, the agency said it "supports motorsports and its contributions to the American economy and communities all across the country. EPA's focus is not on vehicles built or used exclusively for racing, but on companies that don't play by the rules and that make and sell products that disable pollution controls on motor vehicles used on public roads." But nonetheless, EPA said it "has decided to eliminate the proposed language from the final rule."

The issue arose at a March 15 hearing where the Specialty Equipment Market Association raised concerns about the provision and threatened to sue EPA over it, though it did not join the litigation. EPA in a notice of data availability last year sought comment on those objections.

In response to EPA's April 15 announcement that it removed the provision, Republican Reps. Fred Upton (MI); Ed Whitfield (KY), who is now retired; and Richard Hudson (NC) said, "EPA slammed the brakes on their gambit to regulate auto racing. EPA had no business using Heavy Duty Truck rules to sideline racecars."

The industry source familiar with the rule says the racing group pursuing the litigation is an "obscure association" that does not believe EPA's fix went far enough.

The source notes that neither the racing challenge nor the trailer petition would revoke the major part of the rule, which is GHG limits from engines and vehicles. However, the source notes that if the trailer provisions are scrapped in litigation or a settlement, "the rule would become automatically less stringent. Or . . . if you keep the overall standards in place you have to [find] those reductions somewhere else on the truck." That likely would result in the loss of widespread industry support, the source says.

The source expects EPA and TTMA to cut a deal that would give trailers more time to comply with the requirement, rather than gut the requirement entirely, though the outlines of any deal are not clear.

The source says despite the fact that the rule is largely considered to be safe from a

congressional effort to revoke it, industry will actively seek to prevent the Trump EPA from gutting the rule through some "creative reachback."

Recent Meeting

Additionally, the source notes that EPA officials, including Office of Transportation & Air Quality Director Chris Grundler, were discussing the agency's light-duty vehicle and truck GHG rules at a Society of Automotive Engineering (SAE) meeting in Washington, D.C., late last month.

The source says the EPA officials gave no indication that their rules may be weakened. This was a surprise, especially for the light-duty rule given last-minute maneuvering by the Obama EPA to short circuit a mid-term review of the rule. Automakers are expected to seek weaker targets through model year 2025, the source says.

The presentations were also a surprise, according to this source, because EPA officials were said to be under a temporary gag order from the Trump administration that is intended to tweak the communication message to reflect the new administration's views.

But Grundler and others agency officials at the closed-door SAE meeting were acting like nothing had changed, the source says, adding that automakers such as Mazda, General Motors and Chrysler all gave presentations suggesting that EPA's mid-term review determination to maintain the standards was wrong.

The source was expecting the "Trump police to walk in and take [the EPA officials] away," based on their defense of the Obama rules. "It was all polite. But there are clear differences of opinion and the industry guys were saying they look forward to working with the new administration."

During a public event hosted by SAE, Grundler also largely defended EPA's mission to protect public health, while repeatedly demurring on predictions of specific agency actions. For example, asked by reporters whether or how EPA might jettison the Obama EPA's light-duty vehicle rule determination, he said, "That will be up to the new administrator." -- *Dawn Reeves* (dreeves@iwpnews.com)

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

To: Charmley, William[charmley.william@epa.gov]
From: Moulis, Charles
Sent: Wed 2/1/2017 9:12:10 PM
Subject: Summary of Phase 2 Petitions.docx
Summary of Phase 2 Petitions.docx

To: Dickinson, David[Dickinson.David@epa.gov]
Cc: Johnson, Dennis[Johnson.Dennis@epa.gov]; Simon, Karl[Simon.Karl@epa.gov]; Wysor, Tad[wysor.tad@epa.gov]; Charmley, William[charmley.william@epa.gov]; Moulis, Charles[moulis.charles@epa.gov]; Kataoka, Mark[Kataoka.Mark@epa.gov]
From: Orlin, David
Sent: Tue 1/31/2017 4:12:30 PM
Subject: RE: HD Phase 2 litigation/trailers

Mark Kataoka is covering it for OGC and Sue Chen is covering it for DOJ.

Ex. 5 - Attorney Client

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

From: Dickinson, David
Sent: Tuesday, January 31, 2017 10:31 AM
To: Orlin, David <Orlin.David@epa.gov>
Cc: Johnson, Dennis <Johnson.Dennis@epa.gov>; Simon, Karl <Simon.Karl@epa.gov>; Wysor, Tad <wysor.tad@epa.gov>; Charmley, William <charmley.william@epa.gov>
Subject: HD Phase 2 litigation/trailers

David –

Would you mind letting me know who the OGC attorneys will be on this case as well as whom from DOJ? As you know, I worked a bit of the "trailer legal authority" issue with you and Silverman **Ex. 5 - Attorney Client**

Ex. 5 - Attorney Client

Ex. 5 - Attorney Client

I'd like to help out with this case.

David

David Dickinson

202-343-9256

Dickinson.David@epa.gov

To: Charmley, William[charmley.william@epa.gov]
From: Storhok, Ines
Sent: Mon 1/30/2017 9:43:17 PM
Subject: latest budget spreadsheet
FY17 planning revised 01_30_2017 IS.xlsx

Bill – I moved the file to the ASD/status of funds directory, so Tricia can access. I created a folder there called Fy2017 budget planning. Anyway, I'm attaching the latest for your convenience.

Ex. 5 - Deliberative Process

Let me know if you have any questions.

Ines.

To: Charmley, William[charmley.william@epa.gov]
From: Grundler, Christopher
Sent: Thur 1/26/2017 8:34:14 PM
Subject: FW: ACT Expo, MSTRS task, catching up for 2017

Note request for EPA speaker. I think this is one for ASD, but let me know your thoughts

From: Rich Kassel [mailto:rich.kassel@gladstein.org]
Sent: Thursday, January 26, 2017 3:31 PM
To: Grundler, Christopher <grundler.christopher@epa.gov>
Subject: ACT Expo, MSTRS task, catching up for 2017

Hi Chris –

We haven't spoken in a bit, so this email will cover a few things.

First, you'll recall that GNA runs the Advanced Clean Transportation Expo (ACT Expo) every year. This year, we'll be hosting it in Long Beach, CA, from May 1 - 4. We're having two sessions that will cover the EPA/NHTSA Phase 2 rules. First, we'll be having a general session called "Focusing Freight on Efficiency" on the morning of May 3, which will focus on new vehicle and engine standards and the strategies that will be used by fleets to innovate and comply. Second, we're having a workshop/forum session on the morning of May 4 called the "Ultra Clean Heavy-Duty Summit," which will focus on the range of near-zero and zero-emission technologies that are being developed for the MD and HD sectors. I'd like to invite you to speak at one or both, or ask you to suggest another OTAQ person to represent the office. My guess is that Matt would be the right person if you don't come (he did a great job at our ultra-low NOx meeting in Chicago last fall), but I'll leave that up to you, of course. In the spirit of full, early disclosure, I'm not sure if I will be in California that week, but you'll recall that the ACT Expo attracts a large, knowledgable crowd, and it's a good audience for EPA's great work. More information about the two sessions is below.

Second, I've spoken with Kathryn about the MOVES work group membership issue. I'm reviewing some materials that she sent me this morning, and will be sending the letter that she requested shortly. Before I do, however, can I get a few minutes of your time to ask a question that I'm wondering about?

Last, it's a new year, and I'd love to chat a bit about the office's priorities for the year ahead. Regardless of whether I'm wearing MSTRS hat, my GNA hat, or any of my other hats on that

call, I'm really asking to chat a bit about how I can best help you and the Office succeed in the challenging year that lies ahead.

I hope this message finds you well.

Talk to you soon,

Rich

May 3, 2017

8:30 a.m. - 10:45 a.m.

GENERAL SESSION

Medium- and Heavy-Duty General Session

9:45 a.m. - Focusing Freight on Efficiency

Building on the opening session, this panel will provide additional details on industry efficiency improvement projects and strategies, as well as insight into how these near-term efforts then connect to the longer-term evolution to truck platooning, automation and potentially driverless trucks. This session will start off by diving deeper into the EPA's Phase 2 GHG Rule to help fleet customers understand what this regulation will really mean to their future planning and procurement plans. Higher costs; increased vertical integration of truck, engine, and powertrain components; and fewer options from OEMs are expected. With implementation of the trailer standards set to take effect in 2018, and the truck and engines standards in 2021, hear from industry leaders on this session about what these new standards and rules mean to your fleet and future procurement costs and options. Beyond the EPA Phase 2 GHG Rule, get an update on the second round of SuperTruck funding. SuperTruck II projects will research, develop, and demonstrate technologies to improve heavy-truck freight efficiency by more than 100 percent, relative to a manufacturer's best-in-class 2009 truck, with an emphasis on technology cost-effectiveness and performance. Hear which OEMs are participating, what technologies they will be testing, and what goals they hope to achieve.

US EPA (invited)

Volvo (tentatively confirmed; awaiting speaker)

US DOE SuperTruck (invited)

NACFE (invited as a moderator)

May 4, 2017

9:00 a.m. - 11:45 a.m.

WORKSHOPS & FORUMS

Ultra Clean Heavy-Duty Vehicle Summit

The heavy-duty vehicle sector is at the dawn of a new era-one characterized by an array of zero emission technology. From full battery electric trucks, buses, and other equipment to hydrogen fuel cell trucks that can travel 1,200 miles, what will the future look like? Not to be left behind, ultra-low emission heavy-duty natural gas and propane autogas engines are here today, and many believe we will see diesel engines fight back in the coming years. Local, state, and federal regulators have noticed these advancements and are charging ahead with low-NOx rule-making efforts at the national level and in California. Meanwhile, leading progressive fleets are making big investments in these zero and near zero emission technologies which, when combined with renewable fuels, can provide a heavy-duty vehicle platform that has virtually no emissions. Find out first-hand how the heavy-duty sector is poised to do a 180 and go from the largest source of regional criteria emissions and greenhouse gas emissions to a sector that contributes almost no harmful air emissions. Hear from leading stakeholders on these fast-paced developments in the market so that you understand what is real, what is happening, and when these products will be required and available.

Regulatory Landscape**:** US EPA (invited)**;** CARB (invited); SCAQMD (invited)

Electric: Andy Swanton, BYD (confirmed); Fuso; Trevor Milton, Nikola (confirmed); Michael Simon, Transpower (invited)

Gaseous Fuels**:** Joe Thompson Roush, CWI, eControls

Future of Diesel: CARB, Volvo

Rich Kassel

Senior Vice President
Gladstein, Neandross & Associates

5 Penn Plaza, 23rd Floor

New York, NY 10001

212.849.6861 direct

Ex. 6 - Personal Privacy cell

rich.kassel@gladstein.org

GLADSTEIN, NEANDROSS & ASSOCIATES

CLEAN TRANSPORTATION & ENERGY CONSULTANTS

Rethink Methane Symposium | *February 21-22, 2017 – Sacramento, CA*

Advanced Clean Transportation "ACT" Expo | *May 1-4, 2017 – Long Beach, CA*

This communication may contain material that is confidential or legally privileged. It is intended solely for the use of the intended recipient(s). Any interception, review, reliance, disclosure, distribution or forwarding by anyone other than the intended recipient and without express permission is strictly prohibited.

To: Spears, Matthew[spears.matthew@epa.gov]; Spears, Matthew[spears.matt@me.com]; Charmley, William[charmley.william@epa.gov]
From: Matthew Spears
Sent: Thur 1/26/2017 3:55:21 AM
Subject: Matt Spears SAE Presentation
SAE Govt Industry 2017 Matt Spears Presentation.pptx

To: Grundler, Christopher[grundler.christopher@epa.gov]; Charmley, William[charmley.william@epa.gov]
From: Hengst, Benjamin
Sent: Wed 1/25/2017 10:03:51 PM
Subject: RE: Meeting request for CEO of TOTE (Totem Ocean Trailer Express) -- 1/30 or 2/3

He and I had reason to chat again later this afternoon and I politely reminded him of this

From: Grundler, Christopher
Sent: Wednesday, January 25, 2017 3:48 PM
To: Charmley, William <charmley.william@epa.gov>
Cc: Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Subject: Re: Meeting request for CEO of TOTE (Totem Ocean Trailer Express) -- 1/30 or 2/3

When you talk to Chris ask him what happened to the request from Saltchuk leadership

Christopher Grundler, Director

Office of Transportation and Air Quality

U.S. Environmental Protection Agency

202/564-1682 (Washington DC)

734/214-4207 (Ann Arbor MI)

On Jan 25, 2017, at 12:23 PM, Charmley, William <charmley.william@epa.gov> wrote:

Chris –

Ex. 5 - Deliberative Process

Second, once this meeting is scheduled, we will get on your calendar for a 30 minute pre-brief, to prepare you for the discussion.

Thanks

Bill

From: Grundler, Christopher
Sent: Tuesday, January 24, 2017 5:20 PM
To: Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Cc: Stewart, Gwen <Stewart.Gwen@epa.gov>; Atkinson, Emily <Atkinson.Emily@epa.gov>; Charmley, William <charmley.william@epa.gov>; Samulski, Michael <samulski.michael@epa.gov>
Subject: Re: Meeting request for CEO of TOTE (Totem Ocean Trailer Express) -- 1/30 or 2/3

Ben-

Yes, and let him know I have not changed jobs....keep Bill in the loop

Also, neither of these days am I in DC but we can arrange a call or video conference, or choose another day in that week that I am in town

Christopher Grundler, Director

Office of Transportation and Air Quality

U.S. Environmental Protection Agency

202/564-1682 (Washington DC)

734/214-4207 (Ann Arbor MI)

On Jan 24, 2017, at 5:13 PM, Hengst, Benjamin <Hengst.Benjamin@epa.gov> wrote:

Emily, Chris:

See below. Apparently Chris is now the Acting AA!

Chris—you want me to call Chris and ask what he's looking for?

From: Chris Coakley [mailto:CCoakley@saltchuk.com]
Sent: Tuesday, January 24, 2017 4:57 PM
To: Atkinson, Emily <Atkinson.Emily@epa.gov>
Cc: Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Subject: Meeting request for CEO of TOTE (Totem Ocean Trailer Express) -- 1/30 or 2/3

Good afternoon Emily,

I would like to request a meeting with Acting Assistant Administrator Chris Grundler for Anthony Chiarello, CEO of TOTE, to discuss what steps are required for TOTE's re-application to EPA for an Emissions Control Area permit under MARPOL Annex VI.

Mr. Chiarello has availability on January 30 or February 3. Please let me know if Administrator Grundler's schedule can accommodate a meeting on either day.

Thank you for considering this request.

Kind regards,

Chris

Christopher Coakley | Vice President of Government Affairs | **Saltchuk**

direct: 202.650.6910 | mobile: 202.236.0647 | fax: 202.965.1729 | ccoakley@saltchuk.com

1000 Potomac Street NW, Suite 200 | Washington, DC 20007 | www.saltchuk.com

<image002.png>

To: Charmley, William[charmley.william@epa.gov]
From: Orlin, David
Sent: Wed 1/25/2017 9:33:54 PM
Subject: RE: discussion with DOJ on trailers

I am free for the next hour or so. Feel free to call or let me know when is a good time for me to call you.

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

From: Charmley, William
Sent: Wednesday, January 25, 2017 4:29 PM
To: Orlin, David <Orlin.David@epa.gov>
Subject: RE: discussion with DOJ on trailers

David –

If you have time later today, I would like to catch up with yon on this topic regarding the trailer rule and TTMA.

Thanks

Bill

From: Orlin, David
Sent: Monday, January 23, 2017 11:34 AM

To: Charmley, William <charmley.william@epa.gov>
Subject: FW: discussion with DOJ on trailers

Ex. 5 - Attorney Client

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

From: Orlin, David
Sent: Monday, January 23, 2017 11:30 AM
To: Moulis, Charles <moulis.charles@epa.gov>
Cc: Kataoka, Mark <Kataoka.Mark@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>
Subject: discussion with DOJ on trailers

Chuck,

Ex. 5 - Attorney Client

Ex. 5 - Attorney Client

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

To: Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Orlin, David[Orlin.David@epa.gov]
Cc: Sutton, Tia[sutton.tia@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]
From: Charmley, William
Sent: Wed 2/1/2017 9:16:59 PM
Subject: RE: LDV/HDV litigation question
DRAFT Summary of Phase 2 Petitions, Feb 1, 2017.docx

David –

The attached is specific to heavy-duty Phase 2, and it's a table that I asked Chuck to pull together last week. It is not on light-duty. I am not currently aware of any litigation on the Light-duty Final Determination, but perhaps something has come in.

OGC doesn't need to use this, but it could be a start, if you or Mark K. wanted to work off of this. Note that this includes Petitions for Reconsideration, in addition to challenges through the court.

Thanks

Bill

From: Hengst, Benjamin
Sent: Wednesday, February 01, 2017 3:57 PM
To: Charmley, William <charmley.william@epa.gov>; Orlin, David <Orlin.David@epa.gov>
Cc: Sutton, Tia <sutton.tia@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>
Subject: FW: LDV/HDV litigation question

Bill, David:

Sarah Dunham needs a quick summary of any litigation issues related to either LD or HD GHG programs. This is not to hand out to folks—this is just for Sarah's background in case she gets asked in upcoming briefings for the beach head team. She anticipates getting asked, however.

David—can you (or the right folks) put together a summary? Nothing detailed—she is thinking bullet points or a table. Deadline is COB tomorrow.

Thanks

Ben

From: Lewis, Josh
Sent: Wednesday, February 01, 2017 3:37 PM
To: Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Sutton, Tia <sutton.tia@epa.gov>
Subject: LDV/HDV litigation question

Either of you have handy info on whether there's (1) any active litigation on LDV (related: a summary of previous major court decisions on the earlier rule); and (2) any schedule/next steps on HDV litigation (I assume it's too early…given we only recently received the two petitions for judicial review).

I can give some more background, if needed.

Josh

-2095

To: Haugen, David[haugen.david@epa.gov]; Matt Brusstar[Brusstar.Matt@epa.gov]; Barba, Daniel[barba.daniel@epa.gov]
From: Charmley, William
Sent: Thur 1/26/2017 7:29:43 PM
Subject: FW: ASD participation in SAE Conference in D.C. this week - and several presentation's EPA gave
2017 SAE GI Olechiw_20170125a, LD GHG overview.pdf
SAE Govt Industry 2017 Matt Spears Presentation on HD GHG and NOx.pdf
SAE GI Olechiw_20170125a, slide 4 only.ppt
2017 SAE LD Gasoline Symposium 23 January 2017 Charmley Final, Presented by Karl Simon.pdf

Dan –

I wanted to share this email with you, and the attachments, in case you wanted to share it with any of the members of your Center. While ASD had the opportunity to make several presentations this week on a few of OTAQ's programs, we could not have done the LD MTE work, or for that matter the HD Phase 2 rule, without the significant involvement of NCAT as integral members of those two teams.

I think in particular the "2017 SAE GI Olechiw .." and "2017 SAE LD Gasoline Symposium .." presentations would be of interest to NCAT.

Thanks

Bill

From: Charmley, William
Sent: Thursday, January 26, 2017 12:29 PM
To: OAR-OTAQ-ASD <OAROTAQASD@epa.gov>
Subject: ASD participation in SAE Conference in D.C. this week - and several presentation's EPA gave

Dear all –

This email is an fyi, containing information regarding some recent OTAQ/ASD activities that may be of interest to you.

In Washington this week there are two Society of Automotive Engineering (SAE) conferences which EPA participated in, and I wanted to share some information on these, and thank the many ASD staff who were involved in the planning. By far the more significant conference is the annual **SAE Government-Industry Meeting.** For this annual conference, EPA is a co-sponsor of the conference, along with SAE, and two other Federal agencies – NHTSA and DOE.

For this year's conference, several ASD staff and managers were involved in organizing or presenting on a number of panels. Specifically:

- **Houshun Zhang,** co-organizer of the session called "What's Next for Heavy Duty?"
- **Cheryl Caffery**, co-organizer of a session on Advanced Materials/Light-weighting
- **Kevin Bolon**, co-organizer of a session on Light Duty GHG/CAFE
- **Mike Safoutin**, co-organizer of a session on Electric Drive – Markets & Vehicles
- **Mike Olechiw**, presenter at the Light Duty GHG/CAFE session

- **Matt Spears**, presenter at the What's Next for Heavy Duty? session

There were also session organizers from several other Divisions in OTAQ - Aaron Sobel, Kristin Kenausis, Aaron Hula, and Paul Argyropoulos.

In addition, Karl Simon is EPA's official representative for managing this conference with SAE, and Arman Tanman is OTAQ's key person for recruiting ideas from across OTAQ and ensuring each of the session organizers have the information they need for this conference.

Also, Troy Hottle, a colleague of ours in ORD, presented on Vehicle Mass Reduction and Life Cycle Assessment. This project is one that ORD initiated several years ago at ASD's request to support the light-duty GHG mid-term evaluation project. Cheryl Caffery will send around to everyone Troy's final presentation in a few days.

I have also attached the presentations given by Mike and Matt at the conference, for those of you who are interested. Because the Power Point files are so large I converted them to PDFs, but for one of Mike's slides which has animation it ruins the whole point of the slide, so the attached power point is specifically Slide 4 of Olechiw's material. You need to open it in presenter view and wait a few seconds. It's worth the wait.

Finally, earlier in the week SAE also had a small conference on gasoline vehicle emission control technology. I was going to present the attached presentation at that conference, but due to bad weather all of the flights to DC on Monday morning were canceled. Fortunately, Karl Simon was able to fill in for me. That presentation provides information on the Tier 3 program (including early data on the gasoline sulfur compliance and MY2016 vehicle compliance), as well as an update on OTAQ's compliance activities, and a discussion of light-duty GHG topics.

To: OAR-OTAQ-ASD[OAROTAQASD@epa.gov]
From: Charmley, William
Sent: Thur 1/26/2017 5:29:56 PM
Subject: ASD participation in SAE Conference in D.C. this week - and several presentation's EPA gave
2017 SAE GI Olechiw_20170125a, LD GHG overview.pdf
SAE Govt Industry 2017 Matt Spears Presentation on HD GHG and NOx.pdf
SAE GI Olechiw_20170125a, slide 4 only.ppt
2017 SAE LD Gasoline Symposium 23 January 2017 Charmley Final, Presented by Karl Simon.pdf

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- **Mike Safoutin**, co-organizer of a session on Electric Drive – Markets & Vehicles

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To: Queen, Irene[queen.irene@epa.gov]
From: Charmley, William
Sent: Wed 1/18/2017 1:47:02 PM
Subject: RE: Party

Irene,

It was nice to meet you yesterday, and I am glad you came to Rita's retirement. I'm all for open interaction between all of the OTAQ Divisions.

Yes, I'm leading the OTAQ team on the regulatory development side for our standards for ships, planes, cars, trucks, etc. I think you mentioned you are working on SmartWay. In the past 7 years my Division used many elements of the Smartway program to develop the manadatory GHG standards for the commercial trucking sector, and in the first rulemaking on that we had deep involvement from Cheryl Bynum and her staff, and in the most recent rulemaking a lot of help on our new trailer standards from Dennis Johnson and Sam Waltzer from the TCD team in Ann Arbor.

Welcome again to OTAQ

Bill

From: Queen, Irene
Sent: Tuesday, January 17, 2017 4:11 PM
To: Charmley, William <charmley.william@epa.gov>
Subject: Party

Hi Bill,

I was glad to chat with you at Rita's retirement party (that I crashed ☺) because since I have only been here in Ann Arbor as of June, I like to take advantage to talk with people who work in different corners of the building. I am intrigued and excited to be part of the work here, and of course I had to search the EPA website to learn more about what you are working on, since you said you were the Director at the Division from which Rita had retired. I saw that you are leading a team that will have an enormous impact in reducing GHG through fuel economy and emission standards, and though everyone here plays an important role, actions towards protecting the grandkids from climate damages are those close to the heart.

It's pretty easy to get stuck in a cubicle silo, so I'm glad I ventured out this afternoon to learn more about different initiatives here. With such a late-life career change, I can't hope to build the kind of legacy that you have, but I'm glad to be part of the OTAQ team.

Thanks for taking the time to visit!

Irene

Irene T Queen

ORISE Participant

U.S. Environmental Protection Agency

2000 Traverwood Drive

Ann Arbor, MI 48105

(734) 214-4677

www.epa.gov/smartway

EPA-HQ-2018-001738: Production Set #1

UPDATE ON U.S. EPA'S RECENT REGULATORY ACTIVITIES RELATED TO ON-HIGHWAY HEAVY-DUTY VEHICLES AND ENGINES

Matthew Spears, Center Director
Heavy-duty Engine and Vehicle Standards
Office of Transportation and Air Quality, U.S. EPA

SAE INTERNATIONAL

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

ED_001546_00002137-00001

Presentation Overview

Recent Regulatory Activities for Heavy-duty Engines and Vehicles

- Finalized Heavy-duty Fuel Efficiency and GHG Phase 2 Standards
  - Built upon the success of Phase 1
  - Overview of the Phase 2 Final Rule

- Responded to Petitions Calling for Further HD NOx Reductions
  - Preliminary assessment of the need for reductions
  - Opportunities for cost-effective reductions
  - Next steps

Phase 2: Built upon the Success of Phase 1

- Final Phase 1 Model Year 2018 vehicle standards are being met
  - Manufacturers are complying with a single national program
  - EPA confirmatory tests to date have not shown indications of non-compliance
  - Also, no evidence of a market pre-buy or no-buy

- Compliance summary for Phase 1
  - Different mixes of off-the-shelf technologies are being used to meet performance-based standards
    - More emphasis on aerodynamic technologies than the path we projected
    - Less emphasis on non-adjustable idle shutdowns and speed limiters
  - Emissions credit averaging and banking is being utilized
  - We anticipate Phase 1 banking as a path toward initial Phase 2 compliance
  - Phase 2 increased credit generation opportunities in Phase 1

Phase 2: Key Program Elements, Beyond Phase 1

- Vehicle standards now fully recognize tractor and vocational vehicle powertrain technologies: engine, transmission, axle, hybrids, idle reduction
- Expanded number of vehicle regulatory subcategories to better align additional technologies with vehicle applications to ensure real-world reductions
- Revised certification drive cycles and test procedures to better reflect real world performance; especially for powertrain technologies
- Trailer standards finalized
  - A new program that delivers cost-effective reductions
  - Gradual increases in stringency; a number of flexibilities
  - Limited scope—certain trailer categories exempted; special flexibilities for small businesses
  - On Nov 16, 2016 EPA and NHTSA held a public Trailer Certification Workshop
    - https://www.epa.gov/air-pollution-transportation/heavy-duty-greenhouse-gas-ghg-trailer-implementation-workshop

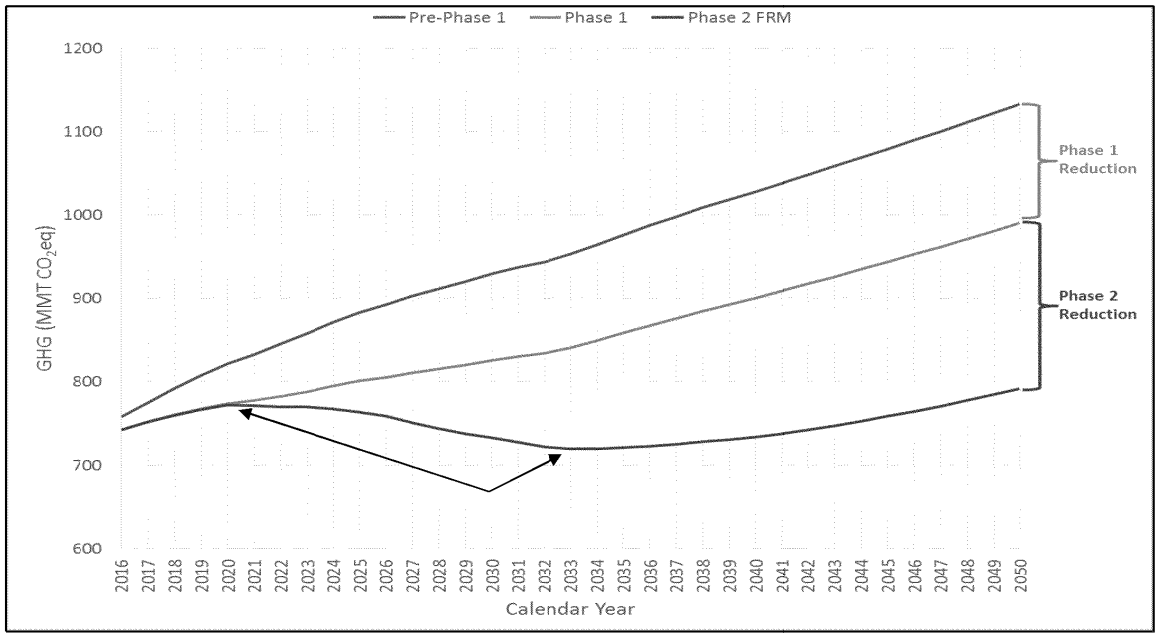
Phase 2: Stakeholder Engagement and Key Outcomes

- Final rule directly reflects our sustained stakeholder engagement
  - Over 400 meetings with a wide array of stakeholders
  - Two separate public hearings, plus two comment period extensions
  - Stakeholders provided significant new data and information after the proposal
  - Issued a separate notice of new data, with an additional 30-day comment period
  - Addressed >200,000 public comments
  - Many commenters have noted their own impact on the final rule

- Finalized a cadence of performance-based, technology-advancing standards
  - Long-term standards and flexibilities out to 2027+ achieve significant net benefits and regulatory stability
  - Encourages long-term technology investment and provides lead-time for demonstrating reliable solutions across a diverse range of vehicles
  - Standards pay for themselves in fuel savings before the next standards go into effect
  - Special flexibilities for small and custom businesses
    - Simplified testing, delays for compliance, unique standards

Phase 2: Total Annual Fuel and GHG Trends

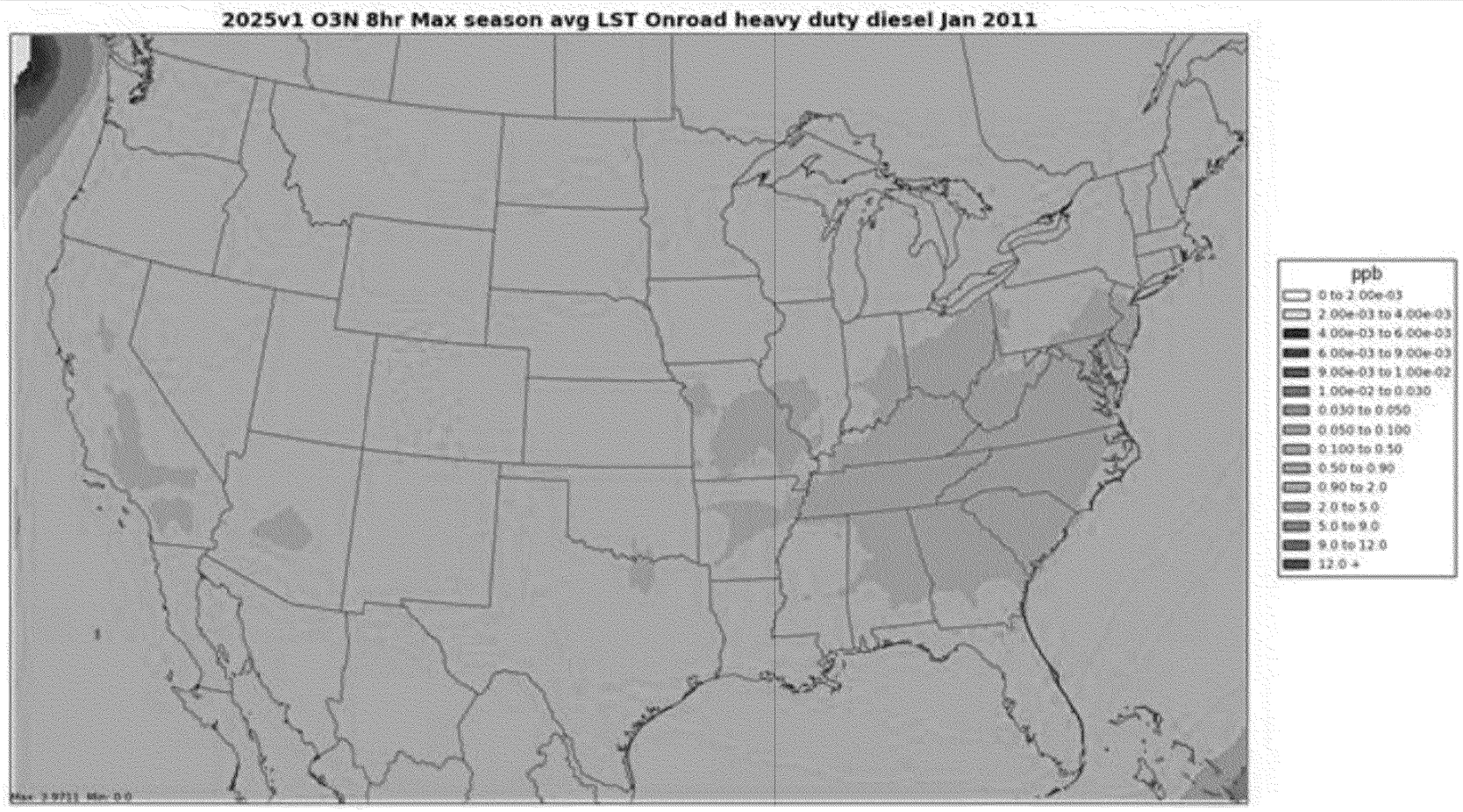
- Final Rule projected to achieve benefits beyond what was proposed
  - A number of improvements made, based on stakeholder comments
  - 2 billion barrels of fuel savings that translate into 1.1 billion tons of CO2 reductions
  - Favorable payback periods for vehicle operators
  - 13 years of net reductions within the heavy-duty transportation sector—which is the fastest growing



Mobile Source NO_X

- **Why do we care about NO_X?**
  - Health and environmental effects associated with ozone and $PM_{2.5}$
    - NOx is a precursor to ozone and $PM_{2.5}$
  - Health and environmental effects associated with NOx
    - NOx exposure is linked to respiratory health effects
    - Deposition of NO_X can be harmful to ecosystems
    - NO_X can impact visibility
- **Mobile source emissions are projected to account for about 25% of ambient ozone in 2025**
- **Heavy-duty on-highway diesel sector is one of the largest mobile source contributors to ozone in 2025**

HDD NO_X Contribution to Ozone - 2025



Key Messages in our Response to Petitions

- Clean Air Act directs EPA to establish heavy-duty engine standards and revise these standards from time-to-time
  - It's been over fifteen years since EPA last considered revising HD NOx standards
  - Significant cost effective technologies have been developed since last standards were finalized in 2000
- We recognize the national need for further NOx reductions from heavy-duty trucks and engines
  - Areas in most need are distributed around the country, and many HD vehicles travel interstate
- We plan to consider a number of HD NOx program elements to achieve additional cost-effective reductions
  - Revised standards using updated test cycles to better reflect real-world driving
  - Revised in-use compliance and on-board diagnostics requirements
  - Revised regulatory useful life and warranty requirements
  - Review current rebuilding and remanufacturing practices
  - Consider incentives for fleet turnover

Next Steps

- Continue to engage with a wide range of stakeholders
  - Truck and engine manufacturers, suppliers and labor
  - Dealers, fleets and operators
  - States, regions, tribes and other countries
  - Nongovernmental environmental organizations

- Participate in CARB's HD Low NOx Workshops and Workgroups
  - https://www.arb.ca.gov/msprog/hdlownox/hdlownox.htm

- Intend to initiate work to propose HD NOx standards and other program elements, consistent with all aspects of the Clean Air Act—including lead-time requirements
  - Opportunity to align with Phase 2's 2024 standards

To: Spears, Matthew[spears.matthew@epa.gov]; Moulis, Charles[moulis.charles@epa.gov]
From: Charmley, William
Sent: Thur 3/30/2017 2:41:43 PM
Subject: RE: For Bill's review: Response to Sen Loudermilk re: trailers **with NHTSA input**

Matt & Chuck,

Thanks. I just read the version Joe S. sent to me, it looks very good. Thank you both for the time you put into this response.

Bill

From: Spears, Matthew
Sent: Thursday, March 30, 2017 9:14 AM
To: Charmley, William <charmley.william@epa.gov>
Cc: Moulis, Charles <moulis.charles@epa.gov>
Subject: Re: For Bill's review: Response to Sen Loudermilk re: trailers **with NHTSA input**

Hi Bill,

We did include a quote and citation to the NAS trailer recommendations.

I've asked Joe to forward you the draft that was sent up for AA review & signature.

Matthew Spears

Center Director, Heavy-Duty Diesel Standards

U.S. Environmental Protection Agency

2000 Traverwood Dr.

Ann Arbor, MI 48105

spears.matthew@epa.gov

w. 734-214-4921

m. 734-276-7079

On Mar 29, 2017, at 16:53, Charmley, William <charmley.william@epa.gov> wrote:

Matt and Chuck –

Do you know what the status of this control is? Do you decide to include a few sentences on the previous heavy-duty NAS studies on trailers?

Thanks

Bill

From: Charmley, William
Sent: Monday, March 13, 2017 8:36 AM
To: Spears, Matthew <spears.matthew@epa.gov>; Moulis, Charles <moulis.charles@epa.gov>
Subject: RE: For Bill's review: Response to Sen Loudermilk re: trailers **with NHTSA input**

Matt and Chuck,

I think the draft response is good. I only had a few recommendations, which are shown in

the attached.

Thanks

Bill

From: Spears, Matthew
Sent: Friday, March 10, 2017 10:00 AM
To: Charmley, William <charmley.william@epa.gov>
Subject: For Bill's review: Response to Sen Loudermilk re: trailers **with NHTSA input**

Hi Bill,

Jim Tamm replied to me today with some minor suggested edits to our draft response letter. I incorporated these edits in the attached updated draft.

Ex. 5 - Deliberative Process

Also, this morning Joe Simon and Chuck reminded me that we should be moving this response up the review chain because we are now past the due date. When do you think that you might be able to review and comment on the draft response? I can then request an appropriate time extension, thanks.

Regards,

Matthew Spears

Center Director, Heavy-Duty Diesel Standards U.S. Environmental Protection Agency

2000 Traverwood Dr.

Ann Arbor, MI 48105

spears.matthew@epa.gov

w. 734-214-4921

m. 734-276-7079

From: Tamm, James (NHTSA) [mailto:james.tamm@dot.gov]
Sent: Friday, March 10, 2017 8:35 AM
To: Spears, Matthew <spears.matthew@epa.gov>
Cc: Hagen, Ryan (NHTSA) <ryan.hagen@dot.gov>
Subject: RE: House Requests EPA Administrator RECONSIDER THE GREENHOUSE GAS PHASE 2 RULE'S EFFECTS ON TRUCK TRAILERS

Matt,

While we did respond to your separate memo and forwarded draft response letter, I wanted to assure we also responded to the additional points the memo below.

Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

Jim

To: Spears, Matthew[spears.matthew@epa.gov]
From: Charmley, William
Sent: Fri 3/24/2017 6:05:48 PM
Subject: Fwd: Connecting you all for ACT Expo

FYI

Sent from my iPhone

Begin forwarded message:

From: JoAnne Golden-Stewart <joanne.golden@gladstein.org>
Date: March 24, 2017 at 1:45:45 PM EDT
To: "Charmley, William" <charmley.william@epa.gov>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: RE: Connecting you all for ACT Expo

Bill—

We certainly anticipated some reticence since EPA is definitely undergoing some significant changes. We want to wish you best of luck going forward.

Take care,

JoAnne

JoAnne Golden-Stewart

Vice President, Programs

Gladstein, Neandross & Associates
310.573.8551 direct

Ex. 6 - Personal Privacy cell

joanne.golden@gladstein.org

From: Charmley, William [mailto:charmley.william@epa.gov]
Sent: Thursday, March 23, 2017 1:55 PM
To: JoAnne Golden-Stewart <joanne.golden@gladstein.org>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: RE: Connecting you all for ACT Expo

Dear JoAnne,

I apologize for taking so long to get you a response on the invitation to EPA to speak at the ACT Expo in early May.

Unfortunately my team in Ann Arbor will not be able to support this conference. There is a lot going on with EPA in the new Administration, and we are also trying to figure out our overall travel budget for the rest of the year, but without having a full year's budget.

I have spoken with several of my managers and senior staff, and unfortunately we will not be able to come to ACT Expo this year.

Best regards,

Bill

Bill Charmley

Director

Assessment and Standards Division

Office of Transportation and Air Quality

U.S. Environmental Protection Agency

National Vehicle and Fuel Emissions Laboratory

2000 Traverwood Drive

Ann Arbor, MI 48105

desk ph. 734-214-4466

cell ph. 734-545-0333

e-mail: charmley.william@epa.gov

From: JoAnne Golden-Stewart [mailto:joanne.golden@gladstein.org]
Sent: Tuesday, March 07, 2017 11:49 AM
To: Charmley, William <charmley.william@epa.gov>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: RE: Connecting you all for ACT Expo

Bill—

I just wanted to loop back around here—I know things have been insane on your side the past six weeks, but I just wanted to check to see whether you've had any luck securing the speakers that Rich was in coordination with you about for ACT Expo? We plan to

announce our full speaker lineup next week and just want to close any remaining gaps we have on the agenda.

JoAnne Golden-Stewart

Vice President, Programs

Gladstein, Neandross & Associates
310.573.8551 direct

Ex. 6 - Personal Privacy cell

joanne.golden@gladstein.org

From: JoAnne Golden-Stewart
Sent: Friday, February 24, 2017 9:20 AM
To: 'Charmley, William' <charmley.william@epa.gov>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: RE: Connecting you all for ACT Expo

Bill—

I hope you're doing well. I wanted to loop back around here as we are hoping to announce our full agenda lineup of speakers next week. Have you been able to identify someone on your side yet?

JoAnne Golden-Stewart

Senior Program Manager

Gladstein, Neandross & Associates
310.573.8551 direct

Ex. 6 - Personal Privacy cell

joanne.golden@gladstein.org

From: JoAnne Golden-Stewart
Sent: Wednesday, February 15, 2017 10:37 AM
To: Charmley, William <charmley.william@epa.gov>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: RE: Connecting you all for ACT Expo

Thanks, Rich Moving you to bcc so as to not clutter your inbox. Bill, we'd love to pick back up on the request to have someone join us for ACT from your team. As Rich indicated earlier, we have a couple of spots we'd love to secure someone for on both Wednesday, May 3, 2017 and Thursday, May 4, 2017. Do you have any suggestions on who would be good here? He said you were running it by a few folks, so I just wanted to loop back around.

As a reminder, the speaking spots are listed below.

May 3, 2017

8:30 a.m. - 10:45 a.m.

GENERAL SESSION

Medium- and Heavy-Duty General Session

9:45 a.m. - Focusing Freight on Efficiency

Building on the opening session, this panel will provide additional details on industry efficiency improvement projects and strategies, as well as insight into how these near-term efforts then connect to the longer-term evolution to truck platooning, automation and potentially driverless trucks. This session will start off by diving deeper into the EPA's Phase 2 GHG Rule to help fleet customers understand what this regulation will really mean to their future planning and procurement plans. Higher costs; increased vertical integration of truck, engine, and powertrain components; and fewer options from OEMs are expected. With implementation of the trailer standards set to take effect in 2018, and the truck and engines standards in 2021, hear from industry leaders on this session about what these new standards and rules mean to your fleet and future procurement costs and options. Beyond the EPA Phase 2 GHG Rule, get an update on the second round of SuperTruck funding. SuperTruck II projects will research, develop, and demonstrate technologies to improve heavy-truck freight efficiency by more than 100 percent, relative to a manufacturer's best-in-class 2009 truck, with an emphasis on technology cost-effectiveness and performance. Hear which OEMs are participating, what technologies they will be testing, and what goals they hope to achieve.

US EPA (invited)

Volvo (tentatively confirmed; awaiting speaker)

US DOE SuperTruck

NACFE (invited as a moderator)

May 4, 2017

9:00 a.m. - 11:45 a.m.

WORKSHOPS & FORUMS

Ultra Clean Heavy-Duty Vehicle Summit

The heavy-duty vehicle sector is at the dawn of a new era-one characterized by an array of zero emission technology. From full battery electric trucks, buses, and other equipment to hydrogen fuel cell trucks that can travel 1,200 miles, what will the future look like? Not to be left behind, ultra-low emission heavy-duty natural gas and propane autogas engines are here today, and many believe we will see diesel engines fight back in the coming years. Local, state, and federal regulators have noticed these advancements and are charging ahead with low-NOx rule-making efforts at the national level and in California. Meanwhile, leading progressive fleets are making big investments in these zero and near zero emission technologies which, when combined with renewable fuels, can provide a heavy-duty vehicle platform that has virtually no emissions. Find out first-hand how the heavy-duty sector is poised to do a 180 and go from the largest source of regional criteria emissions and greenhouse gas emissions to a sector that contributes almost no harmful air emissions. Hear from leading stakeholders on these fast-paced developments in the market so that you understand what is real, what is happening, and when these products will be required and available.

Regulatory Landscape**:** Matt Spear, US EPA (invited)**;** CARB: invited SCAQMD: invited

Electric: **Andy Swanton, BYD (confirmed)**; Fuso; Trevor Milton, Nikola (confirmed); Michael Simon, Transpower (invitation made)

Gaseous Fuels**:** Joe Thompson Roush, CWI, eControls

Future of Diesel: CARB, Volvo

JoAnne Golden-Stewart

Senior Program Manager

Gladstein, Neandross & Associates
310.573.8551 direct

Ex. 6 - Personal Privacy cell

joanne.golden@gladstein.org

From: Rich Kassel
Sent: Monday, February 13, 2017 11:46 AM
To: Charmley, William <charmley.william@epa.gov>; JoAnne Golden-Stewart <joanne.golden@gladstein.org>
Cc: Kylie Taylor <kylie.taylor@gladstein.org>
Subject: Connecting you all for ACT Expo

Bill –

I don't recall whether I told you I was leaving GNA when we spoke on February 2 (it wasn't public yet), but I will be leaving Gladstein, Neandross & Associates (GNA) on Wednesday, February 15. It's been a great place to work for 4.5 years, but starting on February 27, I'll be joining Capalino+Company as an executive vice president, directing their new Environment, Energy, and Sustainability practice. (When I land there, I'll send you more details about what I'll be doing).

JoAnne Golden-Stewart, with assistance from Kylie Taylor, will be organizing the ACT Expo sessions that we discussed earlier this month. They will be your contact points for all things ACT Expo going forward, and are great to work with. I hope you get to ACT this year, and if you do, I'm sure you'll enjoy working with them.

Let's talk soon, but I wish you all the best in the meantime,

Rich

Rich Kassel

Senior Vice President
Gladstein, Neandross & Associates

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New York, NY 10001

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Ex. 6 - Personal Privacy cell

rich.kassel@gladstein.org

GLADSTEIN, NEANDROSS & ASSOCIATES
CLEAN TRANSPORTATION & ENERGY CONSULTANTS

High Horsepower "HHP" Summit | *October 11-13, 2016 – Chicago, IL*

Rethink Methane Symposium | *February 21-22, 2017 – Sacramento, CA*

Advanced Clean Transportation "ACT" Expo | *May 1-4, 2017 – Long Beach, CA*

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To: Grundler, Christopher[grundler.christopher@epa.gov]
Cc: Spears, Matthew[spears.matthew@epa.gov]; Simon, Karl[Simon.Karl@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Snapp, Lisa[snapp.lisa@epa.gov]
From: Charmley, William
Sent: Wed 3/15/2017 1:47:09 PM
Subject: Daimler Trucks North America on future of HD transportation and GHGs

Chris –

You may recall that we met Wilfried Achenbach in Portland on the trip you, Angela and I did a few years ago. Wilfried is Martin Daum's #2 person in the company, and the Senior Vice President for Engineering at DTNA.

Think "well to wheel" around emission options

Posted: Mar 14, 2017 9:50 PM | Last Updated: Mar 14, 2017 10:16 PM

INDIANAPOLIS, IN – The trucking industry has to "put on the brakes" when it comes to its thirst for diesel if it hopes to meet targets to slash Greenhouse Gas emissions, according to Wilfried Achenbach, Daimler Trucks North America's senior vice president – engineering and technology. But electric vehicles don't yet offer the answer when the steps to produce electricity are considered.

Speaking at the NTEA's annual Green Truck Summit, Achenbach stressed that diesel engines continue to be the industry's "workhorse" because of their high torque and long-life, delivering 10 kwh of energy per kilogram in a format that is easy to refuel and readily available.

Gone are the days of black smoke belching from exhaust stacks, thanks to a steady rollout of tighter emissions limits since 1990 that have attacked smog-producing NOx, Particulate Matter, Greenhouse Gases and carbon dioxide, he explained. "We should not see it from any modern diesel engine." In fact, a 1998 truck belches 35 times more NOx and 60 times more Particulate Matter than an EPA10 equivalent, he said. "What we've accomplished as an industry, we can be proud."

But there is more to do. The 2016 Paris Agreement to reduce Greenhouse Gases

requires more.

"We have to put on the brakes if we continue burning diesel as we do today, we will not be able to live up to those limits," he said during a keynote address. Transportation accounts for 34% of the carbon dioxide emissions in the U.S. Trucks themselves account for 6%.

While accounting for a smaller share overall, long-haul heavy-duty trucks remain the most significant lever to shift carbon dioxide emissions, he said.

The good news is that gains have been made. "We are not starting from scratch," Achenbach said, referring to the first phase of Greenhouse Gas regulations, and a second phase that begins to roll out in 2018. Combination tractors alone will see fuel efficiency boost 20, 23 and 25% in 2021, '24 and '27 model years.

"In the foreseeable future, 10 miles per gallon will become the new normal for tractor-trailer combinations," he said, referring to the promise shown through SuperTruck programs. "We don't have to wait 10 years. This is going to happen faster."

The improvements, however, will involve looking at a broad range of systems. While 170 horsepower is needed to move 76,000 pounds 62 miles per hour, 85 horsepower is lost to aerodynamic drag and 74 horsepower is lost to rolling resistance, he said. Even a focus on tire pressure will make a difference. "Tire pressure, for me, is one of the underutilized levers we have today," Achenbach says.

But the Daimler executive stressed that electric vehicles are not the answer on their own. Even those have a carbon footprint.

Electricity still has a carbon footprint. "Electricity is not free environmentally. Not as it is today," Achenbach said, noting how 39% of electricity comes from burning coal, and 28% comes from natural gas. "If we want to change something, we need to change this." In Germany, however, 30% of the electricity is from wind and solar. But that takes political will. And money.

When measuring well-to-wheel emissions, diesel and electric vehicles perform relatively the same, he says. A single kilowatt-hour of energy at a wheel end is generated with 1.7 pounds of carbon dioxide whether it involves electricity or diesel, he said. "Currently with our energy mix it doesn't make any sense to go electric," he added. Change that to solar panels, thermal power plants and windmills, the carbon dioxide begins to drop.

Surprisingly, the vehicle technology is available. It just comes at a cost.

A truck powertrain would require 720-volt batteries and the underlying power distribution, an inverter, and electric motor, he explained. The high-voltage batteries face the biggest issues because of cost and energy density. One day of driving more than 950 kilometers with diesel will require 450 liters of fuel, weighing in at 840 pounds

and costing about $1,162. Looking at 2022, the battery pack would weigh 11,022 pounds and cost $156,239.

"Be careful that you take everything into the equation that might contribute to emissions," he said.

From: Richards, David
Sent: Wednesday, March 15, 2017 9:36 AM
To: Acevedo, Frank <acevedo.francisco@epa.gov>; Adams, Elizabeth <Adams.Elizabeth@epa.gov>; Alson, Jeff <alson.jeff@epa.gov>; Argyropoulos, Paul <Argyropoulos.Paul@epa.gov>; Audette, Lucie <audette.lucie@epa.gov>; Barba, Daniel <Barba.Daniel@epa.gov>; Beardslee, Renee <Beardslee.Renee@epa.gov>; Beardsley, Megan <Beardsley.Megan@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>; Bizer-Cox, Daniel <Bizer-Cox.Daniel@epa.gov>; Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Bradish, Tracey <bradish.tracey@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Bunker, Byron <bunker.byron@epa.gov>; Burch, Julia <Burch.Julia@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>; Caldwell, Amy <caldwell.amy@epa.gov>; Charmley, William <charmley.william@epa.gov>; Chatfield, Ethan <chatfield.ethan@epa.gov>; Clark, Sarah <clark.sarah@epa.gov>; Cohen, Janet <cohen.janet@epa.gov>; Cook, Leila <cook.leila@epa.gov>; Cullen, Angela <cullen.angela@epa.gov>; Dickinson, David <Dickinson.David@epa.gov>; Dietrich, Gwen <Dietrich.Gwen@epa.gov>; Dotzel, Kathryn <dotzel.kathryn@epa.gov>; Drake, Kerry <Drake.Kerry@epa.gov>; Fowlkes, Sarah <fowlkes.sarah@epa.gov>; Galano, Fidel <Galano.Fidel@epa.gov>; Grundler, Christopher <grundler.christopher@epa.gov>; Haley, Mike <Haley.Mike@epa.gov>; Hassan, Nora <hassan.nora@epa.gov>; Haugen, David <haugen.david@epa.gov>; Helfand, Gloria <helfand.gloria@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Henning, Julie <henning.julie@epa.gov>; Hoyer, Marion <hoyer.marion@epa.gov>; Hula, Aaron <Hula.Aaron@epa.gov>; Imfeld, Sterling <imfeld.sterling@epa.gov>; Jackman, Dana <jackman.dana@epa.gov>; Jackson, Cleophas <jackson.cleophas@epa.gov>; Johnson, Dennis <Johnson.Dennis@epa.gov>; Keller, Jennifer <Keller.Jennifer@epa.gov>; Kolowich, Bruce <kolowich.bruce@epa.gov>; Kurpius, Meredith <Kurpius.Meredith@epa.gov>; Lakin, Matt <Lakin.Matthew@epa.gov>; Le, Madison <Le.Madison@epa.gov>; Levin, David <Levin.David@epa.gov>; Lie, Sharyn <Lie.Sharyn@epa.gov>; Lo, Doris <Lo.Doris@epa.gov>; Machiele, Paul <machiele.paul@epa.gov>; Maguire, Andrea <Maguire.Andrea@epa.gov>; Manners, Mary <manners.mary@epa.gov>; Martz, Kathleen <martz.kathleen@epa.gov>; McCubbin, Courtney <McCubbin.Courtney@epa.gov>; Meekins, Tanya <Meekins.Tanya@epa.gov>; Michaels, Harvey <Michaels.Harvey@epa.gov>; Miller, Patrick <miller.patrick@epa.gov>; Mitchell, George <Mitchell.George@epa.gov>; Moltzen, Michael

<Moltzen.Michael@epa.gov>; Mylan, Christopher <Mylan.Christopher@epa.gov>; Nam, Ed <nam.ed@epa.gov>; Nelson, Brian <nelson.brian@epa.gov>; Nims, Kirk <Nims.Kirk@epa.gov>; Olechiw, Michael <olechiw.michael@epa.gov>; Patulski, Meg <patulski.meg@epa.gov>; Peralta, Maria <Peralta.Maria@epa.gov>; Perez, Idalia <Perez.Idalia@epa.gov>; Revelt, Jean-Marie <revelt.jean-marie@epa.gov>; Samulski, Michael <samulski.michael@epa.gov>; Sargeant, Kathryn <sargeant.kathryn@epa.gov>; Schenk, Ruth <schenk.ruth@epa.gov>; Schweinfurth, Rob <Schweinfurth.Rob@epa.gov>; Scoville, Pat <Scoville.Pat@epa.gov>; Simon, Karl <Simon.Karl@epa.gov>; Snapp, Lisa <snapp.lisa@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>; Spieth, John <Spieth.John@epa.gov>; Storhok, Ines <storhok.ines@epa.gov>; Suarez, Patricia <suarez.patricia@epa.gov>; Sun, Lisa <Sun.Lisa@epa.gov>; Sutton, Tia <sutton.tia@epa.gov>; VanGessel, Benjamin <vangessel.benjamin@epa.gov>; Vawters, Katie <Vawters.Katie@epa.gov>; Watkins, Erica <Watkins.Erica@epa.gov>; Wehrly, Linc <wehrly.linc@epa.gov>; Weihrauch, John <Weihrauch.John@epa.gov>; Wilcox, Jason <Wilcox.Jason@epa.gov>; Witkowski, Nicolas <witkowski.nicolas@epa.gov>; Yarbrough, Cody <yarbrough.cody@epa.gov>; Zaremski, Sara <zaremski.sara@epa.gov>; Zimpfer, Amy <Zimpfer.Amy@epa.gov>
Subject: OTAQ Daily News Brief

OTAQ Daily News Brief

****Welcome everyone to OTAQ's daily news listserv. The OTAQ Daily News Brief compiles articles from around the world focused on our office's work; this includes everything from light duty/heavy duty vehicles, electric vehicles, air quality studies, aircrafts, boats and ships, to alternative fuels, and of course, climate change. If you'd like to be removed or would like to add another person to the listserv please contact David Richards at richards.david@epa.gov. Feedback welcomed. Thanks and enjoy!**

Bloomberg

Cities Shop for $10 Billion of Electric Vehicles to Defy Trump

Dozens of U.S. cities are willing to buy $10 billion of electric cars and trucks to show skeptical automakers there's demand for low-emission vehicles, just as President Donald Trump seeks to review pollution standards the industry opposes. Thirty cities including New York and Chicago jointly asked automakers for the cost and feasibility of providing 114,000 electric vehicles, including police cruisers, street sweepers and trash haulers, said Los Angeles Mayor Eric Garcetti, who is coordinating the effort. That would be comparable to about 72 percent of total U.S. plug-in sales last year. While urban leaders want more low-emission vehicles to ease the role city traffic plays in altering the climate, automakers say there aren't enough buyers. They

also have advocated for relaxing rules on traditional fuel vehicles. The Trump administration, which seeks to cut regulations it sees as too costly or onerous, is poised to announce Wednesday that it will reconsider tighter standards finalized a week before President Barack Obama left office.

Trump to Drop Climate Change From Environmental Reviews, Source Says

President Donald Trump is set to sign a sweeping directive to dramatically shrink the role climate change plays in decisions across the government, ranging from appliance standards to pipeline approvals, according to a person familiar with the administration's plan. The order, which could be signed this week, goes far beyond a targeted assault on Obama-era measures blocking coal leasing and throttling greenhouse gas emissions from power plants that has been discussed for weeks. Some of the changes could happen immediately; others could take years to implement. It aims to reverse President Barack Obama's broad approach for addressing climate change. One Obama-era policy instructed government agencies to factor climate change into formal environmental reviews, such as that for the Keystone XL pipeline. Trump's order also will compel a reconsideration of the government's use of a metric known as the "social cost of carbon" that reflects the potential economic damage from climate change. It was used by the Obama administration to justify a suite of regulations.

NPR

EPA Reopens U.S. Rules Setting Vehicle Efficiency Standards For 2025

U.S. automakers may not have to reach fuel efficiency standards that were set during President Obama's administration, as the Environmental Protection Agency says it's reopening a review of the rules. President Trump will make that announcement on Wednesday in meetings with auto industry executives and workers in Michigan. In Washington, a senior White House official said the president wants to "set standards that are technologically feasible, economically feasible and allow the auto industry to grow and create jobs." The Obama-era rules stemmed from an agreement the government reached with major vehicles in the summer of 2011, setting carbon dioxide emissions targets for passenger cars and light trucks that were equivalent to the industry's fleet of achieving an average of 54.5 miles per gallon by the 2025 model year. The reopening of the rules review comes after a request from the Alliance of Automobile Manufacturers, an industry group that represents both domestic and foreign automakers. The group's request came last month, after the confirmation of Scott Pruitt as EPA administrator.

E&E News

Methane from power plants far exceeds EPA estimates — study

A new study shows that estimates of how much methane escapes from natural gas-fired power plants and oil refineries could be much too low, pointing to pollution from leaky industrial hardware. Researchers from Purdue University estimated that emissions from power plants fueled by natural gas could be 21 to 120 times higher than figures in U.S. EPA's most recent final greenhouse gas inventory. For oil refineries, emissions may be 11 to 90 times higher than EPA estimates. The study was published yesterday by the journal Environmental Science & Technology. The team used Purdue's flying atmospheric chemistry lab — a Beechcraft Duchess light twin-engine airplane equipped with an airflow measurement probe — to collect daily samples at three natural gas power plants and three refineries from July 30 to Oct. 1, 2015. "Our objective was to collect reliable data to compare to the inventories," said Paul Shepson, director of Purdue's Climate Change Research Center. EPA's greenhouse gas reporting program focuses on how much escapes from belching power stacks, without considering that methane could be leaking from compressors, valves and industrial hardware, Shepson explained. "The good news from our study is that while emissions are greater than anticipated, natural gas-burning power plants are still cleaner, relative to burning coal," Shepson said.

Los Angeles Times

What to expect when Trump takes on fuel economy and clean air regulations Wednesday

The Trump administration is expected to announce a review of fuel economy and emissions regulations Wednesday morning that could lead to an overhaul of the standards set in place by the Obama administration. Current emissions rules were put in place in January, when President Obama's Environmental Protection Agency finalized mileage and emissions standards for model years 2022-2025. Those standards call for a real-world fuel-burning performance of 36 miles per gallon on average, up from 26 mpg today. A rollback of those rules would have major ramifications for automakers, who for the last several years were under government pressure to build more fuel-efficient cars. Many have complained that the standards were too tough to meet and didn't make sense given historically low gasoline prices and consumer preferences for SUVs. So what exactly will President Trump announce when he travels to a driverless car research center in a suburb of Detroit on Wednesday morning?

Trucking News

Think "well to wheel" around emission options

INDIANAPOLIS, IN – The trucking industry has to "put on the brakes" when it comes to its thirst for diesel if it hopes to meet targets to slash Greenhouse Gas emissions, according to Wilfried Achenbach, Daimler Trucks North America's senior vice president – engineering and technology. But electric vehicles don't yet offer the answer when the steps to produce electricity are considered. Speaking at the NTEA's annual Green Truck Summit, Achenbach stressed that diesel engines continue to be the industry's "workhorse" because of their high torque and long-

life, delivering 10 kwh of energy per kilogram in a format that is easy to refuel and readily available. Gone are the days of black smoke belching from exhaust stacks, thanks to a steady rollout of tighter emissions limits since 1990 that have attacked smog-producing NOx, Particulate Matter, Greenhouse Gases and carbon dioxide, he explained. "We should not see it from any modern diesel engine." In fact, a 1998 truck belches 35 times more NOx and 60 times more Particulate Matter than an EPA10 equivalent, he said. "What we've accomplished as an industry, we can be proud." But there is more to do. The 2016 Paris Agreement to reduce Greenhouse Gases requires more. "We have to put on the brakes if we continue burning diesel as we do today, we will not be able to live up to those limits," he said during a keynote address. Transportation accounts for 34% of the carbon dioxide emissions in the U.S. Trucks themselves account for 6%.

Truck News

Getting ZEVs on the road

INDIANAPOLIS, Ind. – Jodi Proctor, director of clean air policy analysis for Transport Canada, said when it comes to zero emission vehicles (ZEVs), "Range anxiety is one of our biggest concerns that needs to be addressed." Both the Canadian and US governments touted the measures each are taking to encourage the use of ZEVs during the Green Truck Summit March 14 in Indianapolis. Proctor was part of a panel discussion, and she highlighted how Canada's government has placed a high emphasis on climate change and reducing greenhouse gas emissions. Proctor also underscored the close relationship between Canada and the US. "Policy decisions taken on one side of the border have an impact on the other side," she said, adding that despite the importance of work trucks to the North American economy, there is still a need to make improvements for the sake of the environment.

International

Green Car Reports

Half of Norway's new-car sales are now hybrids or electrics

Norway has achieved yet another milestone in electric-car sales. The Scandinavian country may be the friendliest for electric cars in the world, thanks to a combination of aggressive incentives, well-developed charging infrastructure, and a citizenry committed to lowering carbon emissions. Thanks to this unique array of circumstances, electric cars routinely make up a larger percentage of new-car sales in Norway than they do in other countries. As data from this year begins to trickle in, it appears that percentage is growing to levels never seen elsewhere. Half of all new cars registered in Norway in January were electric cars or hybrids, reports The Independent.

Norway's Road Traffic Information Council reported that electric cars accounted for 17.6 percent of new-car registrations in January.

Trucking News

Canada's emission goals take center stage

INDIANAPOLIS, IN – Canada's is embracing an "ambitious" climate change objective that by 2030 would eliminate more Greenhouse Gases than come from every vehicle on the road today, according to Jody Proctor, Transport Canada's director – clean air policy analysis. Almost ¼ of the nation's Greenhouse Gas emissions come from transportation, and 80% of that comes from on-road vehicles, she said during a panel discussion at the annual Green Truck Summit. Trucks account for about 30% of that. "Transportation clearly needs to be part of our climate change solution," she told the crowd, stressing that climate change will cost Canadians $21-43 billion per year by 2050. To meet the goals, Proctor described carbon pricing as an "effective, transparent and efficient policy approach". Referenced options included British Columbia's carbon tax, the Alberta carbon levy, and cap-and-trade models introduced in Ontario and Quebec. Every Canadian jurisdiction must have a carbon pricing model by 2018, set at $10 per tonne in 2018 and rising to $50 per tonne by 2022. Last month, the federal government also introduced a discussion paper around pending clean fuel standards to reduce the emissions related to fuel, she added. Related strategies included renewable fuel mandates, their specific Greenhouse Gas performance standards, and limits on the overall carbon intensity of fuels. Since 2008, for example, British Columbia has required diesel to have 4% renewable fuel. Last year, Ontario began requiring 4% of diesel to include bio-based diesel.

David Richards

ORISE Research Participant

Office of Transportation and Air Quality

US Environmental Protection Agency

ph. 202.564.4964

To: Storhok, Ines[storhok.ines@epa.gov]
From: Charmley, William
Sent: Tue 3/14/2017 6:36:49 PM
Subject: FW: SAE Congress
Attendance 2017 SAE Congress - as of March 14.xlsx
program.pdf

With the attachments from Stani's note

From: Bohac, Stani
Sent: Tuesday, March 14, 2017 12:44 PM
To: Charmley, William <charmley.william@epa.gov>
Cc: Olechiw, Michael <olechiw.michael@epa.gov>; Salazar-Greene, Natalie <salazar-greene.natalie@epa.gov>; Caffrey, Cheryl <caffrey.cheryl@epa.gov>
Subject: SAE Congress

Dear Bill,

SAE Congress is April 4-6 this year. Per Mike O.'s request, attached is a spreadsheet showing LDVSEC and NCAT plans to attend and information on the 4 papers are being presented from these two centers. Also attached is the Technical Program. I'll work with Natalie and SAE on registration and filling out a training form.

Would you like me to ask the other centers in ASD to send me the same information and coordinate registration and training forms? Or is there someone in your IO that would like to do this?

Let me know if there is anything else I can do.

-Stani

Stani Bohac

Light-Duty Vehicles and Small Engines Center, U.S. EPA

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To: Gonzalez, Gail[Gonzalez.Gail@epa.gov]
From: Charmley, William
Sent: Thur 3/9/2017 2:04:11 PM
Subject: FW: For Bill's review: 1st draft of EPA response to Rep Loudermilk letter re: HD Phase 2 trailers (control AL-17-000-4973)
AL-17-000-4973 Correspondence.pdf
AL-17-000-4973 Control Slip.pdf
AL-17-000-4973 draft Resp Ltr -v1 MWS.docx

Gail –

Please print each of the attached for me.

I will come and get them around 10am or so.

Thanks

Bill

From: Spears, Matthew
Sent: Tuesday, March 07, 2017 11:45 AM
To: Charmley, William <charmley.william@epa.gov>
Cc: Moulis, Charles <moulis.charles@epa.gov>; Simon, Joseph <Simon.Joseph@epa.gov>
Subject: For Bill's review: 1st draft of EPA response to Rep Loudermilk letter re: HD Phase 2 trailers (control AL-17-000-4973)

Hi Bill,

Please find attached for your review both an incoming letter from Rep Loudermilk regarding the HD Phase 2 trailer program and our first draft of a potential EPA response to his letter.

Response

The response has been officially assigned to OAR's AA, currently Sarah Dunham.

Timing

While we only received this letter on Monday, Chuck reminded me that the response due date is currently tomorrow Wednesday March 8, 2017. Do you recommend that we request a time extension so that we can have more time for review and concurrence up to OAR's AA?

NHTSA

Also, I am sending this information to Jim Tamm and Ryan Hagen for NHTSA-DOT's optional feedback, but I am not asking for NHTSA-DOT concurrence on our response.

Regards,

Matthew Spears

Center Director, Heavy-Duty Diesel Standards U.S. Environmental Protection Agency

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From: Simon, Joseph
Sent: Monday, March 06, 2017 8:53 AM

To: Spears, Matthew <spears.matthew@epa.gov>; Moulis, Charles <moulis.charles@epa.gov>
Subject: New Control AL-17-000-4973

Hello Matt and Chuck,

New Control

3/6/17 17014	AL-17-000-4973	RECONSIDER THE GREENHOUSE GAS PHASE 2 RULE'S EFFECTS ON TRUCK TRAILERS	U.S. House of Rep Congress (9) Loudermilk, Barry,Griffith, Morgan,Cramer, Kevin,Babin, Brian,Fortenberry, Jeff,Westerman, Bruce,Noem, Kristi L.,Farenthold, Blake,Yoho, Ted	HDONC	Matt Spears, Chuck Moulis	3/7-3/8

Please see attached.

Any questions, please let me know.

Thanks

Joe Simon

Senior Service America, Inc.

Supporting the USEPA through a Cooperative Agreement

under the Senior Environmental (SEE) Program

Assessment and Standards Division

Direct line 734-214-4835

Email: Simon.Joseph@epa.gov

To: Dravis, Samantha[dravis.samantha@epa.gov]
Cc: Rees, Sarah[rees.sarah@epa.gov]
From: Greenhaus, Doug
Sent: Tue 5/16/2017 3:51:49 PM
Subject: EER
RegReformComments.pdf
RegMaze.pdf
NADA Fed Regulatory Report FINAL May 22 2014.pdf
Critique of EPA Revised SNAP Regulations for Refrigerants.docx

AA Dravis and Director Rees:

Please find attached a copy of the comments NADA filed yesterday, w/attachments. I am also attaching a document on a related topic produced by the Caesar Rodney Institute. When and as appropriate, NADA will provide EPA with additional constructive suggestions for reducing regulatory costs and burdens without compromising the Agency's core missions.

Thank you for the opportunity.

Doug

Douglas Greenhaus

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NADA

Caesar Rodney Institute

Center for Energy Competitiveness

Critique of EPA Revised SNAP Regulations for Refrigerants

David T. Stevenson, Director

October 31, 2016

WWW.CaesarRodney.org

Executive Summary

The US Environmental Protection Agency released revised regulations under Section 612 of the Clean Air Act as part of the Significant New Alternatives Policy (SNAP) program on September 26, 2016. Several existing chemicals used in the refrigeration, non-mobile air conditioning, fire suppression, and foam blowing industries had listings changed from "acceptable" to "unacceptable", and several new chemicals were listed as "acceptable". In addition, the EPA strengthened the refrigerant leak management program covered under Section 608. The EPA claims the changes in each section will reduce CO_2 emissions equivalent to 7 million metric tons. The substantive impact of the change phases out the use of hydrochlorofluorocarbons (HCFC), and hydrofluorocarbons (HFC) in favor of a new class of hydrofluoroolefins (HFO), and propane.

This is the latest regulation involving HFC replacement. The EPA has been dribbling out regulations with one of the first, covering mobile air conditioning in vehicles, released in March, 2011. There are now about a dozen vehicle models using HFO's and new car dealers are in the process of re-tooling and technician training now. The HFC replacement program needs to be viewed in its entirety to get a clear picture of the cost and greenhouse gas reduction.

HCFC's and HFC's had previously replaced chlorofluorocarbons (CFC) in refrigerants, blowing agents, and aerosol propellants because of concerns they were destroying stratospheric ozone which absorbs damaging ultraviolet light before it reaches earth's surface. Fluorocarbon liquids have been used in these applications for their thermodynamic properties of a low boiling point and a high heat of vaporization, combined with being non-corrosive, non-toxic, and non-flammable. However, the stability of these chemicals contributes to a high Global Warming Potential (GWP) because of their residence time in the atmosphere. HFO's share many of the valued properties of HCFC and HFC but have low GWP. For example, the HFC R134a used in automotive air conditioning systems has a GWP of 1300 compared to the replacement R1234yf GWP of less than 1.

We note these significant negative consequences of this regulation:

1) The EPA is once again overreaching its authority by using a regulation specifically related to ozone depletion to regulate greenhouse gas. The regulatory review began as an Executive Order from the President, and a settlement agreement of a lawsuit brought by three environmental groups.
2) The EPA underestimated implementation costs as being under $100 million to bypass a required cost/benefit analysis in the latest regulation. The EPA didn't even publish a total cost estimate in the vehicle regulation. We note this is the same flaw that led to the courts overturning the Mercury & Air Toxics Standard for power plants.
3) The EPA has lowered the flammability standard to classification "2L" for flame propagation from "1" showing no flame propagation, lowering safety.
4) The announced changes to HFO's reduces US greenhouse gas emission by a cumulative miniscule 0.7%. That's worth about than $177 million a year based on recent carbon

dioxide allowance auctions. The transition costs will top $1.5 billion just for the automotive air conditioning segment. Besides the transition costs, added refrigerant costs could add $1 to $1.5 billion a year just for the automotive sector.

5) In some applications the replacement refrigerants will lower appliance efficiency up to 4% increasing operating costs and actually raising carbon dioxide emission.

Considering the above, this regulation faces a potential legal challenge.

EPA Lacks Authority to Regulate for GWP

We note on page 315 of the current Final Regulation (Docket EPA-HQ-OAR-2015-0663)[1] the EPA responds to comments from Arkema, and Mexichem, suppliers of refrigerants, and the Association of Home Appliance Manufacturers. The comments claim the EPA does not have the authority to regulate for GWP in Section 612 where the specific intent was to regulate only for ozone protection. We concur with these comments.

The Montreal Protocol is a treaty approved in 1988 by the US Senate to reduce ozone depleting chemicals used as refrigerants. This directly led to the replacement of CFC's with HFC's. This October, 200 countries agreed to amend the treaty in Kigali, Rwanda, to eliminate HFC use by 2050, as HFC's contribute to global warming. The US State Department is studying whether Senate approval is needed for the amendment. Majority Senate Republicans will need to decide this matter for themselves. We recommend the amendment be put to a vote because of the potential cost impact discussed below that is about six times higher than the modest, potential benefits of the greenhouse gas reduction.

Cost Concerns of the Latest Regulation

The EPA estimates implementation costs of the latest regulation of between $58.8 and $71.3 million for fifty large companies, and another $11.5 and $14.4 million for eighty-nine small businesses[1]. The EPA goes on to conclude "Based on these analyses, EPA does not expect this action to have major economic impacts (greater than $100 million per year) or to have a significant impact on a substantial number of small entities." This is based on a $4 to $5/kg differential in cost between the old refrigerants and the new refrigerants[2]. While prices on the replacements are not readily available we note blends with HFO are likely to be higher than the $4 to $5/kg estimates used by the EPA.

Additionally, premium prices paid by a company only represent the direct economic impact. Premium costs have a ripple effect limiting the money a business spends with other businesses as an indirect impact, which induces less spending elsewhere. These indirect and induced impacts often double or triple the direct economic impact. The EPA cost impact analysis ignored these chain reaction effects that would have raised the costs impacts beyond $100 million.

Cost Concerns of Earlier Regulations

All new automobile car models are being designed for use with HFO R1234yf, instead of HFC R134a[3]. Automotive dealers are required to prepare for the change from Flammability Class 1 to Flammability Class 2L. Current Recover/Recycle/Recharge equipment must be replaced with spark proof equipment, and technicians must be trained. Likewise, aftermarket repair shops must change equipment and train personnel. A local car dealer reports the new equipment costs between $5,000 and $7,000 depending on the car manufacturer. The Mobile Air Conditioning Society estimates 170,000 suppliers will have to replace the equipment[4], so the total cost will be $1 billion. In addition, Honeywell and Chemours, patent holders of the HFO chemical, have announced investments in new HFO production facilities of $530 million[5].

Beyond the transition costs, HFO's will cost dramatically more than the products they replace. An internet search as of this writing shows Chemours "Freon®" R134a currently available in 30 pound cylinders for $129.00, or $4.30/pound. Chemours "Opteon®" R1234yf sells in only 10 pound cylinders for $749, or $74.90/pound. The EPA claimed proprietary pricing information from HFO suppliers suggested a price range of $40 to $60/pound. There are about 18 million new vehicles produced a year[6] (22 ounce charge) so about 25 million pounds of HFO would be used each year. The Mobile Air Conditioning Society estimates only about 64,000 pounds of refrigerant is used annually in A/C systems repairs[7]. At the current price differential the refrigerant change will cost $1 to $1.5 billion a year, and that is only the direct economic impact. We note HFC only represents about 37% of annual US sales of refrigerants and blowing agents[8] and the other segments will likely see major cost impacts.

While we may expect the cost differential between HFC and HFO to diminish in time we expect no immediate price reduction. There is considerable global competition for HFC's and patents ran out a long time ago. However, the HFO chemistry was developed jointly between Honeywell and Chemours and will be covered by patents. No licenses to produce have been granted to other competitors. The experience during the phase out of CFC's has been as the stock of residual and recycled chemical has been reduced for use in older equipment, the price has soared. For example, the current price of R12 CFC is about $40 to $50/pound. The refrigerant industry has become inoculated to high prices. With patent protection, and the EPA requirement to switch to HFO's, there is no reason to believe Honeywell and Chemours will give up profit margin to lower price.

By Lowering Flammability Standards the EPA Adds Unnecessary Risks

We note on page 76 of the Final Regulation[1], Underwriters Laboratory commented, "Clause 7.5.1.2 of ANSI/ASHRAE 15-2013 does not permit refrigerated products using

refrigerants other than those having a flammability classification A1 or B1 (i.e., non-flammable refrigerants) to be installed in public corridors and lobbies." Ice machines and water coolers are often installed in lobbies and corridors. The EPA simply brushes off the problem as being solved at some later date. It appears the EPA is willing to compromise safety to meet its global warming goals.

The Regulation has a Miniscule Impact on GWP

The EPA claims the switch to HFO's in the latest regulation will only lower GWP by 14 million metric tons of CO_2 equivalent. The earlier automotive regulation was expected to save 32 million metric tons[9]. Using the Carbon Tax Temperature Savings Calculator paid for by the EPA, the reduction will impact global temperatures by 0.001 °C by 2100[10]. Carbon Dioxide emission allowances sold for $4.54/ton in the September, 2016, Regional Greenhouse Gas Initiative auction[11] suggesting the value of the emissions reductions of the combined regulations is worth about $177 million a year. The annual average $1.25 billion cost of implementation will be about seven times higher than the savings.

Impacts of Lower Efficiency

New refrigerants mean air conditioning and refrigeration equipment will need to be redesigned. According to the US Energy Information Agency air conditioning and refrigeration uses about 11% of US electricity worth about $47 billion. If energy efficiency dropped just 1% it would cost $470 million. While HFO's appear to offer energy efficiency advantages to HFC's, the substitution of propane in water coolers and ice machines may reduce efficiency according to the EPA.

Conclusion

Given the minor benefits in greenhouse gas reductions of 0.7% of emissions[9], implementation costs seven times the benefits, reduced safety, and questionable authority, this regulation should be overturned by Congress or the courts. In addition, the Senate should vote against the Kigali Treaty Amendment as it has nothing to do with the ozone depletion remediation that was the point of the Montreal Protocol.

Footnotes

1) **[EPA-HQ-OAR-2015-0663; FRL-9952-18-OAR] pages 48-9 https://www.epa.gov/sites/production/files/2016-09/documents/snap_status_change_rule_2_2060_as80.pdf "**
2) "Economic Impact Screening Analysis for Regulatory Changes to the Listing Status of High-GWP Alternatives used in Refrigeration and Air Conditioning, Foams, and Fire Suppression", page 13, file:///C:/Users/dtste/Downloads/EPA-HQ-OAR-2015-0663-0024%20(1).pdf
3) **[EPA-HQ-OAR-2008-0664; FRL-9275-8], section V. first paragraph,**

https://www.regulations.gov/document?D=EPA-HQ-OAR-2008-0664-0240

4) "State of the Industry", Feb.2, 2008, https://www.chemours.com/Refrigerants/en_US/assets/downloads/SmartAutoAC/2008_MACS_Atkinson_State_of_Industry.pdf+, slide 17
5) "Honeywell Announces Major Investment", Dec 10, 2013, http://www.honeywell.com/newsroom/pressreleases/2013/12/honeywell-announces-major-investments-to-increase-hfo-1234yf-production-in-the-united-states, "Chemours Announces Major Investments", May 2, 2016, http://finance.yahoo.com/news/chemours-invest-expanded-capacity-high-201500070.html
6) "US Vehicle Sales Chart", https://ycharts.com/indicators/auto_sales
7) "State of the Industry", Feb.2, 2008, https://www.chemours.com/Refrigerants/en_US/assets/downloads/SmartAutoAC/2008_MACS_Atkinson_State_of_Industry.pdf+, slide 19"
8) Determination of comparative HCFC and HFC emission profiles for the Foam and Refrigeration sectors until 2015", US EPA and ADEME, Table 2.3, https://www.epa.gov/sites/production/files/2015-08/documents/foamemissionprofiles_part1.pdf
9) Inventory of US Greenhouse Gas Emissions and Sinks 1990 to 2014, US EPA https://www.epa.gov/sites/production/files/2016-04/documents/us-ghg-inventory-2016-main-text.pdf Table 4-94 total R134a CO2 equivalent of 60.8 million tons. "State of the Industry", Feb.2, 2008, https://www.chemours.com/Refrigerants/en_US/assets/downloads/SmartAutoAC/2008_MACS_Atkinson_State_of_Industry.pdf+, slide 19" shows 52% of R134a emissions are from MVAC so MVAC emissions equal 31.6 million tons of CO2 equivalent. The latest regulation claims 14 million metric tons of savings for total savings of 46 million metric tons. The grand total of U.S. emissions is 6870 million tons from Figure ES-1. So, the combination of the two regulations reduces greenhouse gas emissions by 0.7%.
10) Carbon Tax Temperature Savings Calculator, CATO, http://www.cato.org/carbon-tax-temperature-savings-calculator
11) RGGI Auction 33 Results, http://rggi.org/market/co2_auctions/results

The Impact of Federal Regulations on Franchised Automobile Dealerships

For the National Automobile Dealers Association

May 2014

All statements, findings, and conclusions in this report are those of the authors and do not necessarily reflect those of the National Automobile Dealers Association.

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Acknowledgements

The Center for Automotive Research (CAR) would like to thank the owners, managers, and other staff at the dealerships that participated in the research for their time, patience, and assistance in collecting and validating the data inputs used in this study. These individuals provided valuable insights into the procedures for complying with federal mandates, as well as estimates of the costs federal regulatory compliance at U.S. light vehicle dealerships.

This study is the result of a group effort. The authors would like to thank Sean McAlinden, CAR's Executive Vice President of Research and Chief Economist, for his mentorship and important contributions to the economic analyses; Diana Douglass, who contributed greatly to the coordination of the project and the production of this document; and Lisa Hart, for her editorial assistance.

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About CAR

The Center for Automotive Research is a non-profit organization based in Ann Arbor, Michigan. Its mission is to conduct research on significant issues related to the future direction of the global automotive industry, organize and conduct forums of value to the automotive community, and foster industry relationships.

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Executive Summary

At the request of the National Automobile Dealers Association (NADA), the Center for Automotive Research (CAR) conducted this study on the economic costs of U.S. light vehicle dealerships' federal regulatory compliance. Cost estimates are for 2012 and are based on interviews that took place in 2013 and 2014.

According to the analysis in this study, in 2012 the average dealership incurred $182,754 annually in federal regulatory compliance costs for regulations pertaining to employment, business operations, vehicle financing, sales, marketing, and vehicle repair and maintenance. These regulatory costs comprised 21.7 percent of the average dealership's 2012 before-tax net profits, or nearly $2,400 per dealership employee. Regulations pertaining to employment, accounting, and vehicle financing made up more than 63 percent of the estimated federal regulatory compliance costs.

Though estimating the cost of compliance with federal regulations is challenging, it is clear these costs are present and impactful at all levels of a dealership organization; indeed, the average dealership needed to sell 106 vehicles in 2012 just to recoup their regulatory compliance costs.

The $3.2 billion spent on regulatory compliance in 2012 was passed on to consumers in the form of higher prices; resulting in an estimated economic cost (total of lost sales revenues and lost consumer plus producer surplus) to light vehicle dealerships of $7.7 billion, and a 10,550 reduction in direct dealership employment. The overall impact on the U.S. economy—including direct, indirect, and expenditure-induced effects—is estimated at $10.5 billion in lost economic output and more than 75,000 fewer jobs in 2012. Every $1 increase in a dealership's regulatory compliance costs results in $3.28 in lost output in the U.S. economy and a net loss to the U.S. Treasury of $0.44.

U.S. light vehicle dealers must comply with a wide range of federal, state, and local regulations, which take time and add to the costs of doing business. As suggested above, these costs are passed along to vehicle purchasers in the form of higher prices, resulting in lower vehicle sales and reduced U.S. employment.

This study examines only the costs incurred by U.S. light vehicle dealerships to comply with a group of some 60 federal regulations; a mere subset of the full catalogue of federal regulations with which light vehicle dealerships must comply. Absent from this subset are "upstream" product regulations, such as federal fuel economy mandates imposed on vehicle manufacturers. The federal government itself estimates that vehicle regulations governing safety and emissions alone comprised 21.5 percent of the $25,517 average cost of a new light-duty vehicle in 2012. Also absent from the subset of Federal regulations examined by this study are state and local mandates which cover other areas of concern or which layer on top of federal regulations, increasing the burden on dealership.

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Introduction

U.S. light vehicle dealerships must comply with a myriad of federal, state, and local regulations, and that compliance takes time and adds to the costs of doing business. These costs are passed along to automotive consumers in the form of higher prices, which result in overall lower vehicle sales. This study looks at U.S. light vehicle dealerships' aggregate cost of compliance with a set of selected federal regulations in the United States. The researchers then estimate the proportion of these costs that are passed on to consumers, the resulting reduction in sales volume, and the economic loss associated with light vehicle dealerships' federal regulatory compliance. The costs of compliance with federal product regulations and state and local mandates are excluded from this study. The U.S . Department of Commerce Bureau of Economic Analysis estimates that federal product regulations regarding safety and emissions comprised 21.5 percent of the $25,517 average cost of a new vehicle in 2012.[1]

Light vehicle dealerships[2] are located throughout the country, and are substantial contributors to local, state, and U.S. economies. In 2012, there were over 17,500 firms engaged in the business of retailing cars and light trucks in the United States, with direct employment of more than 963,000 and annual payroll of over $51 billion.[3] New vehicle dealership revenues of $613 billion in 2011 represented 14.8% of all U.S. retail sales revenue,[4] and CAR estimates that automobile dealers generated over $31 billion in sales, business, and employee personal income taxes to local and state governments, and over $12.6 billion in federal employee personal income tax revenues in 2010.[5]

Dealers are subject to federal regulations that pertain only to those engaged in automotive and commercial truck retail, maintenance, and repair, but they also must comply with regulations that apply more broadly to all employers, all small businesses, all finance organizations, all advertisers, and all retailers. Automotive dealer-specific regulations cover a broad range of issues—including environmental concerns, tax and finance rules, and various consumer protections. Within this subset of regulations, there are some that are mandatory, where fines are levied for non -compliance; some that are required only to receive a benefit (such as a loan or tax credit); and some that are voluntary. There is a range of effort required to comply with each regulation —from very low efforts (refraining from prohibited practices), to very costly process burdens (capital expenditures, documentation, and filing evidence of compliance with government agencies).

[1] U.S. Department of Commerce, Bureau of Economic Analysis. (2013).
[2] Defined as establishments in NAICS classification 441110 New Car Dealers—This industry comprises establishments primarily engaged in retailing new automobiles and light trucks, such as sport utility vehicles, and passenger and cargo vans, or retailing these new vehicles in combination with activities, such as repair services, retailing used cars, and selling replacement parts and accessories.
[3] NADA Data: State of the Industry Report. (2013).
[4] U.S. Census, Statistics of U.S. Businesses. (2011).
[5] Hill, Kim, Debbie Menk and Joshua Cregger. "Assessment of Tax Revenue Generated by the Automotive Sector." Center for Automotive Research. (April 2012).

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Methodology

This study involved an exhaustive review of existing government regulatory compliance analyses, a thorough literature review, primary data collection, estimation of the cost of dealership compliance with the set of selected federal regulations, and a comprehensive economic analysis to estimate the magnitude of the economic losses (higher vehicle prices and lower sales volumes) associated with federal regulatory compliance.

A catalog of major federal regulations that apply to automobile dealers entitled, "The Regulatory Maze: NADA's Annual Update on Federal Regulations," served as the starting point in developing a collection of relevant federal regulations for this analysis. The full listing of the regulations included can be found in Appendix A. The 61 regulations selected for inclusion in this research pertain to employee relations, employee benefits, facilities, business administration, accounting, emergency planning, vehicle financing, sales, marketing, and environmental and employee health regulations relating to service and body shops. Costs of compliance with regulations required only to receive a benefit—such as paperwork associated with the Small Business Administration's Dealership Floor Plan Financing Program; new regulations for which the cost of compliance may not yet be known—such as the Affordable Care Act; or *de minimis* regulations—such as tax exemption procedures for diplomats' vehicle purchases; were excluded from this research. In addition, federal product regulations—such as safety or fuel economy mandates that apply to vehicle manufacturers—were also excluded from this research, as were any state or local regulations pertaining to light vehicle dealerships.

Accounting for the cost of regulatory compliance for automotive dealerships, and the economic consequences of this cost burden is a significant challenge. The U.S. government publishes estimates of time and/or cost required to comply with every regulation subject to the Paperwork Reduction Act of 1995 (PRA) at reginfo.gov, the regulatory portal of the Office of Management and Budget's (OMB) Office for Information and Regulatory Affairs (OIRA). OIRA reviews and publishes data and reports on the information collection activities for all federal government agencies. All federal agencies must estimate the burden of public information collection activities in service of regulatory compliance.

At the outset, researchers knew that supplemental data collection (through dealership surveys) would be necessary to fill in the blanks where government estimates were not available. As it turned out, CAR researchers found the available government regulatory compliance cost data proved to be inadequate for the purposes of estimating the regulatory cost burden borne by a single industry. In addition, government estimates were available for only about 20 percent of the subset of federal regulations included in this study. The study relies almost exclusively on the analysis of primary regulatory cost data collected from comprehensive case study interviews with light vehicle dealerships. Data were gathered through in-person and phone interviews using a structured interview protocol.

CAR researchers used the cost estimates gathered from structured interviews to feed into an economic analysis to determine the proportion of federal regulatory compliance costs that are passed along to consumers in the form of higher vehicle prices, and the loss of total sales volume attributed to these higher prices.

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Review of Existing Data and Research

While data collected by federal agencies on the burden imposed by many regulations, the quality of information on the regulatory compliance burden varies considerably by federal agency —despite concerted efforts to improve quality and achieve greater standardization [6]. There is often considerable uncertainty on the costs of regulatory compliance at the time a new rule is promulgated. As rules change or are amended or reauthorized over time, the government's cost and time burden estimates are revised to be more in line with actual hours and costs. Thus, government estimates tend to be more reliable for regulations that have been on the books for some time. For many rules, the government's estimate of the regulatory burden is available in terms of cost or hours, but not both measures.[7]

OIRA's parent agency, OMB, publishes a summary assessment of regulatory costs and benefits in an annual Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities. In addition, the U.S. Government Accounting Office (GAO) has issued reports on several of the individual regulatory actions or rules that were included in the final list of 61 rules included in this study. GAO's reviews assess the effectiveness of rulemaking, including the economic impact of the regulations they review, and suggest ways in which the regulation itself or the regulatory processes may be improved.

Challenges to the Utilization of Government Regulatory Cost Estimates

CAR's review of the federal regulatory burden on light vehicle dealerships began with an examination of available government regulatory evaluations. Sources reviewed included—but were not limited to: regulations.gov, government agency and program websites, the Federal Register, and OMB-OIRA's annual *Report to Congress* publication series. The text of regulations, regulatory preambles, and the contents of regulatory dockets were explored to review Regulatory Impact Analyses (RIAs), Regulatory Flexibility Analyses (RFAs), and general economic impact estimates. The authors also reviewed non-governmental analyses of regulatory compliance costs found in scholarly reports and journals. Upon completing this review, researchers determined that due to numerous challenges in acquiring and normalizing the government's cost estimates to current dollars and a relevant unit of analysis, the proposed research could not rely on federal government regulatory cost estimates.

At the most basic level, regulatory estimates do not exist for all regulations that impact automobile dealerships. Of the 61 explored rules and regulations, regulatory cost estimates could only be obtained for a third. Other obstacles were the inaccessibility of evaluations, vintage, incomplete data, non-comparable methodologies, and the accuracy of the evaluations. These challenges are acknowledged by OIRA itself: "Individual regulatory impact analyses vary in rigor and rely on different assumptions,

[6] There is some evidence that indicates an overall improvement in quality in regulatory cost assessments conducted after 1993 (post issuance of Executive Orders 12866 and 13563), but standardization has not yet been achieved.

[7] For instance, the Federal Trade Commission's Consumer Product Warranty Rule Information Collection Review (ICR) is only provided in terms of hours, but the ICR for the National Highway Traffic Safety Commission's American Automobile Labeling Act (AALA) states the regulatory burden in terms of both hours and dollars.

including baseline scenarios, methods, and data, thus summing across estimates involves the aggregation of analytical results that are not strictly comparable."[8]

Inaccessibility of Data

A primary constraint on the use of governmental regulatory cost estimates is that the data were frequently inaccessible. Evaluations prior to 1995 can only be retrieved through acquisition of physical, archival copies. Accessing these records was too time-consuming and inefficient for the scope of this study. Also, existing regulatory information is not always publicly available, and reviews of certain data sources proved circular.[9] Other references within the OIRA reports were to the *Regulatory Information Service Center & Office of Information and Regulatory Affairs Combined Information System* (ROCIS), which is not publicly accessible.

Age of Evaluation

The age of the regulations and their corresponding compliance cost evaluations present a series of challenges to any wide-ranging regulatory cost study. The age of an estimate may be problematic if it directly relates to the economic condition of the time. Differing data vintages can complicate the comparison, let alone the summation of cost estimates. The regulations examined as part of this study have widely ranging dates of promulgation. Even within a single regulation or rule, summing the initial cost estimate and the estimates of incremental cost associated with regulatory amendments may not be appropriate due to changes in underlying economic structures, and potential methodological differences between earlier and later estimates.[10] OIRA provides a salient quote:

> "As discussed in previous Reports, OMB has chosen a ten-year period for aggregation because pre-regulation estimates prepared for rules adopted more than ten years ago are of questionable relevance today."[11]

Methodological Incompatibility

Methodological differences, whether resulting from agency-specific philosophies, constraints imposed by lack of data, or other factors, present challenges to the comparability of regulatory cost estimates arrived at separately. There is a great disparity in the quality, content, and methods of regulatory evaluations.[12] Where one evaluation may describe anticipated compliance costs as annualized costs

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[8] Office of Information and Regulatory Affairs. "2008 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities." 5.

[9] One such example is the OIRA Report to Congress annual publication series, which provided total annualized cost estimates for some of the rules and regulations selected for this research. In a few cases, the OIRA report identified source documents as previous OIRA reports.

[10] In other words, as regulatory evaluations age, the underlying assumptions are likely to lose relevance. What was an accurate or reasonable assessment at the time the evaluation was published may be wholly inapplicable today. For example, the incidence of a workplace hazard—such as asbestos—may be lower in the present day as a result of the regulation itself. In addition, new, and perhaps more cost-effective technologies to achieve compliance or mitigate risk may have proliferated; new and superior compliance procedures may have been developed; or general business practices may have changed so as to render the regulation near irrelevant. A routine governmental review of federal regulatory cost estimates could greatly improve the quality of the data that is available.

[11] Office of Information and Regulatory Affairs. "2008 Report to Congress on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities." 5.

[12] Office of Information and Regulatory Affairs. "2013 Draft Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act." 8-9.

imposed upon various industries, others may instead state the anticipated total cost to the private sector. Other complications arise from the fact that some cost estimates are detailed at an industry level, but there is inconsistency as to which industries are included.[13] Rarely do two regulatory evaluations consider the same selection of industries, and the majority of regulations identified by NADA do not discuss compliance costs to be incurred by the automotive dealer industry alone—or even its parent sector, retail trade. Researchers did not expect that regulatory cost estimates would be available at the industry level of light vehicle dealerships for every regulation included in this analysis, but given the varying granularity of the industry categories, it proved difficult to disaggregate published cost estimates to a standard unit of analysis for purposes of this study.

Regulatory Cost Estimate Accuracy

The accuracy of the published estimates is closely related to concerns already identified regarding methodological inconsistencies. A body of literature exists on the accuracy of governmental regulatory cost estimates, but most of this literature exists as *ex ante*, or studies performed prior to the adoption of regulations. These studies are often developed parallel to governmental RIAs, but may rely on different assumptions. Examinations of the accuracy of *ex ante* estimates vis-à-vis realized costs is limited by a relative dearth of post-regulation adoption, or *ex post*, evaluations of compliance costs. Where comparison studies of *ex ante* and *ex post* estimates have been possible, the studies have found that RIAs are substantially more likely to *overestimate* compliance costs than they are to *underestimate* the costs of regulatory compliance.[14] [15]

Several factors contribute to the frequency of overestimation, ranging from particularities of the implemented methodologies, lack of requisite data, and other uncertainties. As RIAs are performed *ex ante*, various assumptions typically based on current business practices and available technologies must be made regarding likely compliance paths. Across the literature on the *ex ante* / *ex post* gap, the most frequently cited reason for *ex ante* overestimation is the unanticipated use of existing technologies or

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[13] For example, the 2012 Hazard Communication Final Rule describes anticipated costs to industries at the 3-digit NAICS level, while the 1991 Bloodborne Pathogens rule only discusses a handful of selected industries, primarily within the healthcare, education and protection (police, fire, etc.) industry groups. (U.S. Department of Labor, Occupational Safety and Health Administration. Hazard Communication. Occupational Exposure to Bloodborne Pathogens, Section 7-VII.)

[14] Bailey et al. "Mind the gap! Comparing *ex ante* and *ex post* assessments of the costs of complying with environmental regulation."
Hammitt, James. "Are The Costs of Proposed Environmental Regulations Overestimated? Evidence from the CFC Phaseout."
Eisenberry, Ross and Shapiro, Isaac. "Deconstructing Crain and Crain: Estimated cost of OSHA regulations is way off base."
Harrington et al. "On the Accuracy of Regulatory Cost Estimates."
Thompson et al. "Validating Benefit and Cost Estimates: The Case of Airbag Regulation."

[15] Harrington et al. (2000) evaluate the accuracy of the *ex ante* regulatory compliance cost estimates presented in RIAs by comparing them to available private and academic ex post compliance cost estimates. The Harrington study includes 21 U.S. federal regulations, thirteen of which are from the U.S. Environmental Protection Agency (EPA), and eight are from the Occupational Safety and Health Administration (OSHA). The Harrington study considers the *ex ante* estimates of compliance costs to be accurate if the ex post figure falls within the range presented by the RIA. Where only a point estimate is presented in the *ex ante* study, they instead consider the *ex ante* estimates accurate if the ex post figures are within a range of ± 25 percent of the *ex ante* point estimate. Results of this analysis showed seven of the thirteen EPA regulations overestimated compliance costs, and two EPA regulations underestimated the cost. For the eight OSHA regulations, six overestimated compliance costs and one underestimated costs. (Harrington, et al. "On the Accuracy of Regulatory Cost Estimates." 306-307.)

the development of new technologies. [16] Common methodological sources of over-estimation include alteration of the rule prior to its promulgation yet after RIA completion, and the proclivity of agencies to estimate the expected maximum compliance cost rather than the expected actual cost. Uncertainty in the estimation of baselines encourages overestimation of the number of firms or workers which will be impacted by the regulation. [17] More general data limitations, such as a lack of data on the costs of relevant equipment or technologies, further contribute to the inaccuracy of compliance cost estimates.[18]

Primary Data Collection

The concerns outlined in the previous section prevented use of official government regulatory cost figures in ascertaining the aggregated cost burden of federal regulations on light vehicle dealerships. Due to these concerns, the researchers proceeded to gather cost estimate data directly through case studies of a select group of dealerships.

The breadth and complexity of the selected regulations made the data gathering process better-suited for in-person interviews as opposed to web-based surveys. Dealership-relevant regulations were organized into categories, with descriptions of the specific dealership activities related to each category. For example, the employee relations category encompassed regulations such as the Americans with Disabilities Act, Equal Pay Act, Employment Verification Rules, and Federal Wage-Hour and Child Labor Laws, among others. Other categories include d employee benefits, facilities, business administration, accounting, emergency planning, vehicle financing, sales, marketing, and environmental and employee health regulations relating to service and body shops. The costs associated with these categories were also organized by category, including costs for employee compensation, third-party contractors, capital equipment, and supplies. The regulations associated with each category were then used to create a structured interview framework for use during the interviews. A full description of the included regulations is found in Appendix A, and the interview framework document is in Appendix B.

Cost Impact Assessment

The purpose of this paper is to assess the economic impact of Federal regulatory costs on motor vehicle dealerships. To do so, CAR researchers assumed that these costs are passed on to customers in terms of higher prices paid for new and used vehicles and vehicle maintenance and services. It was also assumed that higher prices would reduce dealership business from all departments, and result in lower economic contribution created by the motor vehicle retail sector. Because regulations increase dealership prices and reduce consumer's demand for dealership services, the loss of dealership economic contribution is deemed economic net loss, or so called "dead weight loss." In other words, CAR's model estimates: 1) the loss of consumer demand for the motor vehicle retail sector; 2) the loss of dealership economic contribution (which is consumer plus producer surplus lost, also "dead weight loss"); and 3) the

[16] Bailey et al. "Mind the gap! Comparing ex ante and ex post assessments of the costs of complying with environmental regulation." 253-254.
Hammitt, James. "Are The Costs of Proposed Environmental Regulations Overestimated? Evidence from the CFC Phaseout."
Eisenberry, Ross and Shapiro, Isaac. "Deconstructing Crain and Crain: Estimated cost of OSHA regulations is way off base." 2-3.
Harrington et al. "On the Accuracy of Regulatory Cost Estimates." 300, 309, 310.
[17] Ibid. 310-312.
[18] Thompson et al. "Validating Benefit and Cost Estimates: The Case of Airbag Regulation." 804, 809-810.

equivalent loss of U.S. employment from above losses due to an higher prices created by the Federal government's regulation of motor vehicle dealerships.

To estimate motor vehicle dealership revenue loss due to an artificially higher price, one must first carefully define dealership producer price. The producer price index (PPI) differs from the consumer price index (CPI) because PPI measures changes over time in producers selling price, and CPI measures the changes in consumer's purchase price. In addition, PPI does not include sales and excise taxes, which are included in CPI. However, PPI includes other costs and expenditures to producers, which may or may not be passed on to consumers; these include distribution costs, and costs of regulatory compliance. According to the U.S. Bureau of Labor Statistics (BLS), the method to calculate PPI and CPI is a modified Laspeyres index, which includes the targeted commodity's quantity and price. Therefore, PPI can be treated as a revenue deflator for producers, and CPI as an expenditure deflator for consumers. For the purpose of this model, a motor vehicle dealership PPI is required. Unfortunately, BLS only publishes a motor vehicle dealership industry PPI series beginning in 2004 and for years thereafter. With assistance from NADA, CAR researchers were able to construct our own motor vehicle dealership industry PPI from 1978 to 2012, which consists of commodity PPI's of new motor vehicles, used motor vehicles, and automotive maintenance and repair services.

CAR's estimation model is as follows:

Where:

R = *total dealership revenues*

DP = *producer price index of motor vehicle dealerships*

VP = *consumer price index of new motor vehicles*

V = *new motor vehicle sales, in units*

U = *U.S. unemployment rate*

= *the marginal impact of dealership prices on total dealership revenue (R)*

The model also incorporates CPI-new vehicle as an explanatory variable. CPI-new vehicle measures consumer's purchase price of new motor vehicles. During the period of 1978-2012, an average of 60 percent of total dealership revenue was generated by new vehicle sales. Inclusion of CPI-new motor vehicle increases the explanatory power of the model, and allows for a more reliable estimate of dealership PPI elasticity.

In addition to being sensitive to PPI and CPI, dealership revenues are also affected by an array of factors that are not associated with price—such as interest rates and the general economic environment. Many macroeconomic indicators were considered and tested (see Appendix C), but only a few were finally

selected f or inclusion in the model due to statistical problems such as multi -collinearity and autocorrelation. The final non-price explanatory variables included in the model are the unemployment rate and new vehicle sales volumes. The unemployment rate is a proxy for the general economic environment, and new vehicle sales volumes reflect the overall health of the automotive market. Both of these variables are crucial factors in the determination of dealership revenues.

Findings

The results of the data collection interviews and model estimation are summarized and discussed below.

Interview Results

CAR researchers then used a structured interview framework to guide the discussion with principals, general managers, comptrollers, and other staff of eight light vehicle dealerships to estimate cost of compliance with the selected federal regulations. These data were supplemented with data from a larger, multi-dealership conglomerate. The selected dealerships represented NADA's membership, including two that were part of a larger franchise (Dealers C and H), and four single-rooftops (Dealers A, B, D, and E), a range of domestic, Asian, and European brands sold; and a variety of price points, including economy, mid-range, and luxury vehicles. Additionally, two of the dealerships had a body shop (Dealers A and G), as certain regulations pertain only to those dealerships with body shop operations . The dealerships primarily were located in mid-Michigan, southeastern Michigan (Dealers A, B, C, D, and E) and northern Ohio (Dealers F and G) , with one in Maryland (Dealer H) . During the interviews, the order of topics was randomized to prevent any biases, and interviewees were encouraged to substantiate cost estimates, where approp riate. Interviewees were ask ed to use 2012 costs in th eir estimates.

Dealership Statistics

Table 1 summarizes the basic descriptive statistics for each dealership in the study.

Table 1: Individual Dealership Profiles

	Dealer A	Dealer B	Dealer C	Dealer D	Dealer E	Dealer F	Dealer G	Dealer H
Annual Revenue ($MM)	$44.5	$43.2	$32.6	$45.8	$57.0	$24.6	$142.2	$44.75
Employees (FTEs)	73	39	33	64	58	50	200	76
New Car Sales	844	599	233	1,318	1,230	347	2,972	1,011
Total Car Sales	1,644	1,860	725	1,624	1,516	820	4,812	1,625

The mean revenue among the group w as $54.33 million dollars, and ranged from $24.6 (Dealer F) to $142.2 million dollars (Dealer G). Employment per dealership included in the case studies had a mean value of 74, and a range of 33 (Dealer C) to 200 full time equivalent employees (Dealer G). The average number of vehicles sold at the case study dealerships was 1,828, with the average for new vehicles sales being 1,069. The range of total vehicles sold was 725 (Dealer C) to 4,812 (Dealer G), and the number of new cars sold ranged from 233 (Dealer C) to 2,972 (Dealer G) . Table 2 outlines the case study dealerships corresponding descriptive statistics.

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Table 2: Case Study Dealership Profile

	Mean	Minimum Value	Maximum Value
Annual Revenue ($MM)	54.33	24.6	142.2
Employees (FTEs)	74	33	200
Total Vehicle Sales	1,828	725	4,812
New Vehicle Sales	1,069	233	2,972

The average NADA member had annual revenues of $38.4 million in 2012, which is just over 40 percent lower than the average case study dealership. Dealerships in this study sold an average of 1,828 total new and used vehicles, while the average NADA member's annual sales volume was 1,791 vehicles. The average NADA dealer employed 55 employees (FTEs) in 2012, compared to average employment of 74 for the case study dealerships. Single rooftop dealers comprised 33 percent of NADA's membership in 2012, and 37.5 percent of the dealers in this study; dealership groups with more than 2, but fewer than 10 stores make up 50 percent of NADA members vs. 37.5 percent of dealers in this study; and dealership groups with more than 10 stores represent 17 percent of NADA membership vs. 25 percent of the case study dealers.[19]

Cost of Regulatory Compliance

The volume-weighted average total cost of dealership compliance was found to be $182,754 annually for calendar year 2012. These regulat ory costs comprised 21.7 percent of the 2012 before -tax net profits, or nearly $2,400 per dealership employee. When considering both new and used vehicle sales, the me an cost per vehicle is $100. While this figure does not seem very large, the average dealership would have needed to sell 106 new and used vehicles in 2012 to recoup its regulatory compliance costs.[20]

Analysis of the mean values of compliance costs in Table 3 shows that the dealership financial burden is greatest for the regulations included in the vehicle financing category (which includes items such as Equal Credit Opportunity, Fair Credit Reporting, and Truth in Lending rules), and second greates t for those shown in the vehicle general category (which includes regulations covering government employment, payroll taxes, and wage and hour rules) . Regulations in the sales, service and body shop, and marketing categories imposed lower degrees of compliance cost burden on dealers , respectively. A disproportionate share of the costs are clustered in the vehicle financing and general categories, with nearly two-thirds of the total mean cost of regulatory compliance represented by these two categories. This information is conveyed in Table 3 —outlining the arithmetic mean costs [21] by category and subcategory, as well as the total mean cost of regulator y compliance found among the dealerships included in this study . Detailed descriptions of the regulations included in each of the categories and subcategories can be found in Appendices A and B.

[19] Membership data provided by NADA Research Department.
[20] The average dealership sold 819 new and 975 used cars in 2012. Estimate does not include otherprofit centers.
[21] Not weighted by dealership sales volumes.

Table 3: Average Federal Regulatory Compliance Cost by Category

Category/Subcategory	Estimated Costs	Percent of Costs
Vehicle Financing	$69,388	37%
Administrative	49,438	
Customer Finance Notices	19,949	
General	$48,848	26%
Accounting	17,648	
Business Administration	13,139	
Emergency Planning	368	
Employee Benefits	3,691	
Employee Relations	13,523	
Facilities	480	
Sales	$29,588	16%
Customer Product Notices	29,588	
Service and Body Shop	$24,653	13%
Employee Health and Safety	13,379	
Environmental	11,273	
Vehicle Safety	-	
Marketing	$14,526	8%
Advertising	1,423	
Customer Communication	13,104	
Grand Total	***$187,002***	***100%***

Additional analysis shows that over 71 percent of the mean vehicle financing category of federal regulatory costs, which compose over 26 percent of the total mean dealer compliance costs, are within the administrative subcategory of vehicle financing. The remaining 29 percent of this category comprises the third greatest burden by subcategory within the total mean regulatory cost , and imposes nearly 11 percent of said cost . These subcategories represent costs dealers bear in complying with regulations such as the Equal Credit Opportunity Act and the Gramm-Leach Bliley Act. Costs are accrued by dealers on an internal basis, as well as through use of external contractors to assist in mandatory compliance.

The general categor y cost breakdown reveals that 36 percent of the mean costs in this category are attributed to the accounting subcategory, which is also more than 9 percent and the fourth largest cost subcategory of the observed total mean cost of compliance . The costs within this category primarily relate to general corporate and payroll tax compliance issues. The balance of costs in the general category is attributed to compliance with regulations such as the Americans with Disabilities Act, Family and Medical Leave Act, and rules on record-keeping and retention.

Two of the dealers included in this study are part of a larger dealer group (Dealers C and H). Interviewees at one of these dealerships (Dealer C) were unable to identify some, and possibly a large share, of its regulatory compliance costs. Possibly due to th is dealership's more centralized business

operations, the managerial staff was less knowledgeable about reg ulatory compliance costs than other interviewees. Researchers made a good faith effort to speak with corporate level management at the group to gain further insight into the dealerships costs, though these efforts were ultimately unsuccessful. In light of this fact, descriptive statistics of the case study group may be slightly lower overall than would otherwise be true if additional information had been gained about this dealership's regulatory cost profile. Overall, however, the integrity of the data remains robust even in light of this likely underreporting.

For the second dealer that was part of a larger group (Dealer H) , CAR researchers disaggregated composite data for the group and brought it to a single -rooftop level. In this case, CAR worked with the dealer group to assess costs at a group level for the sake of efficiency and thoroughness. This method, as opposed to the method referenced in the preceding paragraph, allowed the researchers to account for a greater portion of actual costs than would otherwise had been possible. T he findings were then scaled using the number of group dealerships as a divisor. Therefore, descriptive statistics for this dealer profile are the mean findings for the larger enterprise.

It can be challenging for dealers to identify all costs associated with federal regulatory compliance. Some activities are spread am ong many facets of the business and accounting conventions do no t support simple cost analysis. Other cost centers represent activities the dealers themselves admit they would do even if not regulated to do so. However, the data are clear that federal regulatory compliance costs are present and meaningful at all levels of the dealerships' organizations.

Economic Model Results

A multivariable linear regression was performed using the ordinary least square estimation method. The results are shown below, with t-statistics in parentheses. The coefficients are significant at the 5 percent level of confidence, and the model does not suffer from serial correlation (Durbin-Watson = 2.37).

(——) (———) (———) (——)

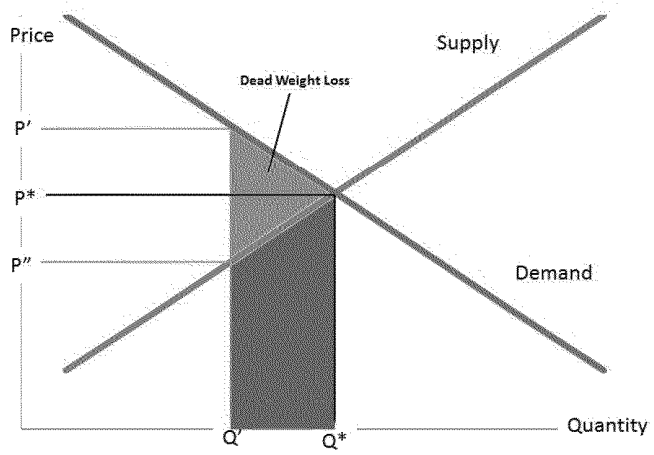
(-3.90) (2.02) (3.82) (14.58) (-2.18) R-Square = 0.90

The regression results indicate that U.S. vehicle demand (V) has the strongest impact on dealership revenue, with one percent increase in market demand resulting in a 0.72 percent increase in dealership revenue. This result indicates that dealership revenue is strongly reliant on overall market demand. The result confirms our data observations, and confirms CAR researchers' expectations.

The marginal impact of new vehicle price (VP) in the model ranks second, with a revenue elasticity of 0.61. This result implies that the relationship between dealership revenue and new vehicle prices is positive, but slightly inelastic. The result is expected , because the average dealership generated 40 percent of its revenue from used vehicle sales and services of all type s. Especially d uring market downturns, the share of revenue that comes from items other than new car sales becomes more critical for dealers, which is confirmed in the model result s. Higher vehicle price s not only generate higher new vehicle sales revenue, but also result s in higher used vehicle residual value , and maintenance and service income for dealerships.

The producer price elasticity is moderate , and is estimated at 0.47. This result implies that dealership revenue is only marginally affected by dea lership producer prices. For every 1 percent increase in dealership producer price (or cost), dealership revenue increases only 0.47 percent. On the other hand, this result implies that the price elasticity for quantity demand is -0.53. The price elasticit y for quantity demand is rather important to the study, because it will be used for calculating both loss of sales and dead weight loss due to higher price, which is illustrated in Figure 1 below.

Figure 1: Dead Weight Loss and Quantity Reduction Due to Higher Prices



In this figure, P* and Q* represent an equilibrium price and quantity had the Federal regulations not existed. P' and Q' represent the price paid by the consumer and market demand with Federal regulations in effect . P" represents the unit price received by dealers after regulatory costs are subtracted from the revenue. The difference between P' and P" is the Federal regulatory compliance cost per unit, and the difference between Q* and Q' represents the demand loss due to higher price. The red area represents the loss of dealership business, and the orange area in the center is the economic dead weight loss due to higher prices as a result of Federal regulatory compliance costs that are passed through to the consumer.

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The sensitivity of dealership price to dealership expense increase

Dealership prices are very sensitive to dealership expenses, largely due to the dealerships' cost structure and net profits. The relationship between dealership expense and dealership gr oss sales can be described by the following equation:

Where:

If gross sales remain constant, every dollar in increased expense causes the same amount of decrease in profit. In terms of percentage, one percent increase in expense will result in – percent decrease in profit. If a dealer would like to maintain its net profit when expenses increase by one percent, the dealer would need to increase its price by —— .

According to NADA' s financial data, the average U.S. dealership gross margin was 13.7 percent from 2000 to 2012, the total selling, general, and administrative expenses was 12 percent, and net profit margin was 1.7 percent. NADA's financial data indicates for every percenta ge point increase in dealership expense, dealership net profit will decrease by seven percent, *ceteris paribus* . A dealer seeking to maintain its profit would have to increase prices by .88 percent.

Federal regulatory compliance cost, and its impact on the U.S. economy

CAR's field interviews with dealers indicate that in 2012, the average de alership's f ederal regulatory compliance cost s were $182,754 per rooftop (weighted average) , or $100 per new and used vehicle sold, or $2,371 per dealership employee. These regulatory compliance cost s accounted for 3.7 percent of total sales, general, and administrative expenses.

Dealerships' regulatory compliance costs were relatively small given that the average general expense was $4.7 million and annual revenue s were $56.7 million per rooftop for the dealers included in this study. Assum ing they had the same profit margin as the national average, a 3.7 percent increase in expenses equates to a 26 percent net profit decrease for the dealerships interviewed. If the deale rs were to make up for that lost profit by raising prices, prices would need to increase 3.2 percent, *ceteris paribus*. Although CAR researchers were not able to surve y or observe to what extent expenses were passed on to consumers, it is reasonable to believe that dealerships increase price s to make up lost profit rather than take a financial hit to their bottom line. For the purpose of this study, the assumption is that the entire cost of federal regulatory compliance is passed on to consumers.

Higher vehicle prices lead to a dead weight loss of both consumer and dealer surplus. The dead weight loss equation is as follows:

This basic equation can be transformed into the following expression[22] using price elasticity for demand and supply:

(—) ———

Where:

(—) *= percent change of dealership price due to regulatory compliance = 3.2%*

= Price elasticity for supply = 1.0

= Price elasticity for demand -0.53

= 2012 per dealership revenue at equilibrium = $38 million

= 2012 dealership producer price index = 159.8

= dealership equilibrium producer price index = 156.5

= price index received by dealers = 154.7

The price elasticity for demand is estimated to be -0.53 in the regression, and the price elasticity for supply is assumed to be 1.0 for the purposes of this study. The loss of dealership business and the economic dead weight loss per dealership are calculated as follows:

(——)

The estimates above indicate each dealership (rooftop) lost $441,332 worth of net business and economic activity in 2012 due to dealership price inflation related to federal regulatory compliance costs. For the entire U.S. light vehicle dealership industry (17,540 dealers in 2012[23]), the direct economic loss is estimated to have bee n $7.7 billion and 10,550 fewer direct dealership jobs in the U.S. economy.[24]

For the regulatory impact on U.S. employment, CAR utilized a specially constructed regional econo mic impact model, and customized the analysis applying the total loss of $7.7 billion across personal

[22] Nicholson, Walter, *Microeconomic Theory, Basic Principles and Extensions, Ninth Ed.* P.324.
[23] NADA Data, op. cit.
[24] Inclusive of the $7.7 billion direct economic cost and 10,550 direct jobs.

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consumption expenditures on new vehicles, used vehicles, motor vehicle parts, and motor vehicle repair and maintenance services. The analysis also took into account regulatory compliance spending of $3.2 billion ($182,754 multiplied by 17,540 dealers) and applied it to non-residential investment. The result shows that the cost burdens of the subset of Federal regulations assessed in this study that are borne by the U.S. light vehicle dealers cost the U.S. economy 75,865 jobs [25], more than $10.5 billion in lost economic output, $3.6 billion in personal income, and $655 million in proprietors' income. The cost of dealership compliance with the selected federal regulations assessed in this study ultimately cost the federal government nearly $1.4 billion in lost social insurance contributions, lost personal tax revenues, and higher transfer payments to individuals.[26]

Table 4: Economic Results of U.S. Light Vehicle Dealerships' Compliance Costs with Select Federal Regulations

Category	2012 Result
GDP	-$6.0 billion
Economic Output	-$10.5 billion
Personal Income	-$3.6 billion
Proprietors' Income	-$655 million
Net Impact on Federal Government Revenues	-$1.4 billion
Social Insurance Contributions	*-$389 million*
Personal Tax Receipts	*-$544 million*
Current Transfer Payments	*+$438 million*
Total Employment Impact	-75,865
Direct Light Vehicle Dealership Employment	*-10,550*
Indirect (Supplier) Employment	*-21,844*
Expenditure-Induced (Spin-off) Employment	*-43,471*

Of the nearly 76,000 fewer jobs in the economy in 2012 as a result of federal regulatory compliance, the retail trade sector suffers most with more than 23,000 jobs lost (10,550 direct jobs at light vehicle dealerships). Job losses in the other services sector (except public administration) rank second, with 14,000 fewer workers. The only sector that shows a job gain is the construction sector, where 3,076 jobs were created by private non-residential investment. Table 5 details the industry sectors affected by the regulatory compliance spending and the loss of dealership business due to higher dealership price.[27]

[25] In addition to the direct employment consequences for light vehicle dealerships (-10,550 jobs), there were losses in other sectors of the economy including indirect employment effects (21,844 fewer jobs at businesses that supplier the light vehicle retailers, including vehicle and parts manufacturers), and expenditure -induced effects (43,471 fewer jobs in the overall economy due to the lower levels of total personal income spent on goods and services).

[26] Transfer payments to individuals include federal unemployment insurance and other public assistance expenditures.

[27] Some argue that federal regulatory compliance also generates economic activity and employment. For example, there are businesses formed to provide training or training materials to educate dealers' employees on how to comply with the regulations. Motor vehicle dealerships in the United States spend roughly $3.2 billion per year in payments to third parties to comply with federal regulations. The economic impact analysis addresses this argument by investing $3.2 billion in private non-residential sector. However, the negative impact of federal regulatory compliance on dealership business outweighs this spending effect by as much as 2.4-to-1.

Table 5: Employment Impact of Higher Vehicle Prices and Lower Vehicle Sales Volumes due to U.S. Light Vehicle Dealerships' Federal Regulatory Compliance Costs

Employment Impact U.S. Total - 2012 Estimates	
Total U.S. Job Loss	(75,865)
Retail Trade	(23,730)
Direct New Car Dealers (subset of Retail Trade)	(10,550)
Other Services, except Public Administration	(14,314)
Wholesale Trade	(8,079)
Manufacturing	(7,416)
Administrative and Waste Management Services	(4,253)
Health Care and Social Assistance	(3,963)
Professional, Scientific, and Technical Services	(3,878)
Finance and Insurance	(3,070)
Transportation and Warehousing	(2,676)
Accommodation and Food Services	(2,190)
Real Estate and Rental and Leasing	(1,586)
Arts, Entertainment, and Recreation	(1,242)
Information	(1,079)
Management of Companies and Enterprises	(886)
Educational Services	(646)
Utilities	(142)
Construction	3,076
Others	209

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Summary of Results

The economic analyses in this study indicate that, for a typical U.S. franchised light vehicle dealership with 2012 revenue of $38 million; the average federal regulatory compliance annual expenditure was $182,754 per rooftop. These regulatory costs comprised 21.7 percent of the 2012 before-tax net profits, nearly $2,400 per dealership employee, and a total of $3.2 billion in compliance costs across all U.S. light vehicle dealerships.

The resulting higher costs due to the potential loss of business revenue plus economic dead weight loss totaled $441,332 per rooftop—equating to $7.7 billion in direct losses to U.S. light vehicle dealerships and 10,550 fewer direct U.S. dealership jobs. This translates to $245 for every new and used vehicle sold, or nearly $8,035 for every dealership employee.

Accounting for the direct, indirect (suppliers to dealerships), and expenditure-induced (spin-off) effects of federal regulatory compliance costs results in a total loss of $10.5 billion to the U.S. economy, and a net employment impact of nearly 76,000 fewer jobs across all sectors. This translates to $334 for every new and used vehicle sold, or nearly $10,925 for every direct dealership employee.

The net impact of federal regulatory compliance costs borne by U.S. light vehicle retailers on the federal government itself is $1.4 billion in lower tax and social insurance revenues and higher unemployment and public assistance expenditures. Every $1 increase in a dealership's federal regulatory compliance costs results in $3.28 in lost output in the U.S. economy, and a net loss to the U.S. Treasury of $0.44.

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Appendix A: List and Description of Federal Regulations

The following describe which regulations the dealerships considered when providing a cost estimate for each regulatory category.

GENERAL

- **EMPLOYEE RELATIONS**
  - **Americans with Disabilities Act (ADA):** Dealerships with 15 or more employees must reasonably accommodate disabled workers and job applicants.
  - **Employee Discrimination:**
    - **Age Discrimination in Employment Act:** Protects older individuals against age-based employment discrimination.
    - **Equal Pay Act:** Prohibits wage discrimination on basis of sex.
    - **Federal Civil Rights Act:** Bars employment discrimination on the basis of race, sex, color, religion, or national origin. Prevents employers from asking job applicants certain questions (such as age, marital status, or childbearing plans). Prohibits workspace sexual harassment, including behavior that creates a hostile work environment.
    - **Genetic Information Nondiscrimination Act:** Prohibits discrimination based on health-related employee DNA information.
  - **Employment Verification Rules:** Dealerships must verify the employment eligibility of prospective new employees using the I-9 form and proper support documentation. Use of E-verify is optional.
  - **Federal Wage-Hour and Child Labor Laws:** Addresses minimum-wage and overtime pay standards and exemptions as well as standards for employing minors, including teen driving restrictions. Federal minimum wage is $7.25 per hour; state minimum wage rates may be higher.
  - **IRS/DOL Worker Classification:** The IRS has launched a Voluntary Classification Settlement Program (VCSP) aimed at encouraging employers to admit to past worker misclassifications. When making worker classification decisions, dealerships should be careful, conservative, and prepared to document their decisions. The IRS and the Department of Labor use multi-factory legal standards and tests to evaluate whether workers are "employers" or "independent contractors." Of greatest importance: the level of control employers exercise over workers as measured by the means and manner of the work performed.
  - **National Labor Relations Board (NLRB) unionization rules:** Governs unionization activities, including employee rights, election rules, postings, unfair labor practices, and others.
- **EMPLOYEE BENEFITS**
  - **Affordable Care Act:** Extensive health-care reforms enacted in 2010 affect dealerships and their health-care plans. For example, large dealerships (with more than 50 full-time employees) must decide by January 1, 2014, whether they will offer health coverage that meets the federal requirements or pay a penalty. Many other reporting, record-keeping, and other duties will apply to dealerships and other businesses. For more information, visit www.healthreform.gov.

- **Consolidated Omnibus Budget Reconciliation Act (COBRA):** Requires dealerships with 20 or more employees to continue health-care coverage for ex-employees and their families for 18 to 36 months, depending on circumstances.
- **Employee Retirement Income Security Act (ERISA):** Dealers offering retirement or health plans must, among other things, provide employees with plan information, keep records, abide by fiduciary responsibilities, and set up a grievance process.
- **Family and Medical Leave Act (FMLA):** Dealerships must post a notice informing employees of their right to take limited, unpaid leave for personal and family medical emergencies and must comply with appropriate requests for such leave. Special provisions apply to leave related to military service.
- **Health Insurance Portability and Accountability Act:** Generally prohibits health insurers from denying coverage to workers who lose or change jobs and bars insurers from excluding coverage for preexisting conditions for more than a year.
- **Uniformed Services Employment and Reemployment Rights Act (USERRA):** Governs the employment and reemployment rights of members of the U.S. uniformed services.

- **FACILITIES**
  - **Americans with Disabilities Act (ADA):** Dealerships with 15 or more employees must reasonably accommodate disabled workers and job applicants.
- **BUSINESS ADMINISTRATION**
  - **Electronic Records Retention:** Revenue Procedure 98-25 explains the IRS requirements for retaining computerized accounting records.
  - **FTC Safeguards Rule:** Dealers must develop, implement, and maintain—and regularly audit—a comprehensive, written security program to protect customer information.
  - **IRS Cash-Reporting Rule:** Dealers receiving more than $10,000 in cash in one transaction or in two or more related transactions must file IRS/FinCEN Form 8300 with the IRS within 15 calendar days and must provide written notice that the report was filed to the person named on the report by January 31 of the following year. "Cash" includes certain cashier's checks, traveler's checks, money orders, and bank drafts.
  - **Mandatory Workplace Posters:** Notices, such as "Your Rights Under the FMLA," "Equal Employment Opportunity Is the Law," "Federal Minimum Wage," and "Notice: Employee Polygraph Protection Act," must be conspicuously displayed.
  - **Miscellaneous record-keeping requirements:** A multitude of requirements govern the length of time records must be maintained. Examples: personal and corporate income tax records must be kept at least three years; notification forms for underground storage tanks must be kept indefinitely; and copies of Form 8300 cash reports must be kept for five years.
  - **Office of Foreign Assets Control (OFAC) restrictions:** Dealerships may not enter into transactions with certain sanctioned countries, governments, and specially designated organizations and individuals, including those appearing on an electronic list maintained by OFAC.
- **ACCOUNTING**
  - **FTC Repossession Rule:** Requires formal accounting of money collected for repossessed vehicles.
  - **General Corporate and Payroll Tax Compliance:** Transactional cost burden associated with the recordkeeping, calculation and filing of dealership Federal corporate and payroll taxes.
  - **Federal child-support enforcement regulations:** Requires states to govern liens put on personal property—including vehicles—for overdue child support. Dealerships should

check that child-support liens don't exist on used cars, and must place liens on wages of employees who are delinquent on child-support payments.

- **EMERGENCY PLANNING**
  - **OSHA Blood-Borne Pathogens Rule:** Dealerships more than four minutes from an emergency health facility must have a program to respond to employees who suffer cuts. All dealerships should have proper first-aid kits.
  - **Emergency-response planning:** Federal, state and local laws require dealers to have emergency-response plans.

SERVICE & BODY SHOP

- **ENVIRONMENTAL**
  - **Clean Air Act:** Dealerships may not tamper with, replace, or remove emissions-control equipment, such as catalytic converters. CFC recycling regulations require dealership air-conditioning technicians to obtain certification and to use certified recycling and recovery equipment to capture spent refrigerant, including HFC-134a and other non-ozone-depleting refrigerants. The act also regulates any fuels dealers store and dispense, as well as the alternative fuels motorists use, including gasohol. It restricts emissions from solvents and chemicals.
  - **Clean Water Act:** Sets standards for regulation of waste-water and storm water at dealerships and also sets comprehensive rules governing above ground oil storage tanks.
  - **Resource Conservation and Recovery Act (RCRA):** Comprehensive environmental law regulating many dealership functions, including underground storage tanks and the storage, management, and disposal of used oil, antifreeze, mercury products, and hazardous wastes. Underground tanks must be monitored, tested, and insured against leaks; leaks and spills must be reported to federal and local authorities and cleaned up. The law also regulates new-tank installations. Dealers must obtain EPA ID numbers if they generate more than 220 lb. per month (about half of a 55-gallon drum) of certain substances and must use EPA-certified haulers to remove the waste from the site; dealers must keep records of the shipments. Used oil should be burned in space heaters or hauled off-site for recycling. Used oil filters must be punctured and drained for 24 hours before disposal.
  - **Superfund (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]):** As waste generators, dealerships may be subject to Superfund liability. Frequently, dealers contract with other companies to haul waste off-site. Dealers can deduct the cost of cleaning up contaminated soil and water in the year in which it is done. Dealers may qualify for an exemption from liability at sites involving used oil managed after 1993. The service station dealer exemption application (SSDE) requires dealers to properly manage their oil and to accept oil from do-it-yourselfers.
- **EMPLOYEE HEALTH AND SAFETY**
  - **Department of Transportation (DOT) hazardous-materials-handling procedures:** Requires parts employees who load, unload, and package hazardous products, such as airbags, batteries, and brake fluid, to be trained in safe handling practices.
  - **OSHA (Occupational Safety and Health Administration) asbestos standards:** Dealerships must use certain procedures during brake and clutch inspections and repairs to minimize workplace exposure. Water, aerosol cleaners, or brake washers may be used to comply with the standard.

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- **OSHA Hazard Communication Standard (right-to-know laws):** Dealers must inform employees about chemical hazards they may be exposed to in the workplace, keep chemical product information sheets on-site and accessible, and train staffers to properly handle the hazardous materials they work with. Recent revisions require retraining employees by December 1, 2013. Also, EPA's community right-to-know rules require dealers to list annually with state and local authorities tanks holding more than 1,600 gallons.
- **OSHA lock-out/tag-out procedures:** Explains what service departments must do to ensure machines, including vehicles, are safely disengaged before being serviced.
- **OSHA Respiratory Protection Standard:** Requires written programs describing how to select, fit, and maintain respirators to protect body shop workers from hazardous chemicals.
- **OSHA workplace health and safety standards**: Extensive regulations cover a multitude of workplace issues and practices, from hydraulic lift operation to the number of toilets required. Example: Dealerships must determine if workplace hazards warrant personal protective equipment and, if so, to train employees on its use. Verbal reports must be made within eight hours of any incident involving hospitalization of three or more workers or any death.

- **VEHICLE SAFETY**
  - **National Highway Traffic Safety Administration (NHTSA) alteration and tire-placarding rules:** Significantly altered new vehicles must have labels affixed identifying the alterations and stating that they meet federal safety and theft standards. Tire-placarding and relabeling rules require a new tire information placard/label whenever parts or equipment are added that may reduce a vehicle's cargo-carrying capacity, or when replacement tires differ in size or inflation pressure from those referred to on the original.
  - **NHTSA tampering rules:** Prohibits dealerships from rendering inoperative safety equipment installed on vehicles in compliance with federal law.
  - **NHTSA tire regulations:** Rule requires proper replacement or modification of the tire-information label when replacing tires or adding weight before first sale or lease. Also, consumers must be given registration cards when buying new tires or tires must be registered electronically. Other rules govern handling and disposal of recalled new and used tires.
  - **NHTSA safety belt/airbag deactivation:** Dealerships may install airbag switches for consumers with NHTSA authorization. Dealerships must be responsive to consumer requests for rear-seat lap/shoulder safety belt retrofits in older vehicles.

VEHICLE FINANCING

- **ADMINISTRATIVE**
  - **Dodd-Frank Financial Reform Law:** Comprehensive legislation enacted in July 2010 created a new, independent Consumer Financial Protection Bureau and granted it unprecedented authority to regulate financial products and services. Dealers engaged in three-party financing are excluded from the authority of the new bureau and remain subject to regulation by the Federal Reserve Board, the Federal Trade Commission (which has been given streamlined authority to declare dealer practices as unfair or deceptive), and state consumer protection agencies. Finance sources, including dealers who engage in "buy here, pay here" financing, are subject to the bureau's jurisdiction. The Dodd-Frank law also created several new obligations for creditors, including new

disclosure requirements for risk-based pricing and adverse-action notices under the Fair Credit Reporting Act (Section-1100F) that took effect July 21, 2011. It also contains a requirement to collect, report to the federal government, retain, and make available to the public upon request certain data collected in credit applications from small, women-owned, and minority-owned businesses. Dealers are temporarily exempt from this requirement pending promulgation of specific regulations.

- **Equal Credit Opportunity Act (ECOA):** Regulation B prohibits discrimination in credit transactions based on race, sex, color, marital status, religion, national origin, age, and public-assistance status. The dealer/creditor is required both to notify applicants in a timely fashion of actions taken on—and reasons for denying—applications, and to retain certain records. (See also "Dodd-Frank Financial Reform Law" for a description of new small-business loan data collection requirements.)
- **Fair Credit Reporting Act (FCRA):** Dealers are restricted in their use of credit reports for consumers, job applicants, and employees. Credit reports generally may be obtained only pursuant to consumers' written instructions or if consumers initiate a business transaction (not if they merely talk with salespeople). Dealers must give job applicants and employees a separate document informing them that a credit report may be obtained and must obtain prior, written authorization to access the report. Dealers may not share credit information with affiliates unless they give consumers notice and the opportunity to opt out. If dealers take adverse action based on the report, they must notify consumers and follow additional procedures with job applicants and employees.

- **CUSTOMER NOTICES**
  - **Equal Credit Opportunity Act (ECOA):** Regulation B prohibits discrimination in credit transactions based on race, sex, color, marital status, religion, national origin, age, and public-assistance status. The dealer/creditor is required both to notify applicants in a timely fashion of actions taken on—and reasons for denying—applications, and to retain certain records. (See also "Dodd-Frank Financial Reform Law," for a description of new small-business loan data collection requirements.)
  - **Fair Credit Reporting Act (FCRA):** Dealers are restricted in their use of credit reports for consumers, job applicants, and employees. Credit reports generally may be obtained only pursuant to consumers' written instructions or if consumers initiate a business transaction (not if they merely talk with salespeople). Dealers must give job applicants and employees a separate document informing them that a credit report may be obtained and must obtain prior, written authorization to access the report. Dealers may not share credit information with affiliates unless they give consumers notice and the opportunity to opt out. If dealers take adverse action based on the report, they must notify consumers and follow additional procedures with job applicants and employees.
  - **FTC (Federal Trade Commission) Credit Practices Rule:** Dealers are required to provide a written disclosure statement to a cosigner before the cosigner signs an installment sales contract. Dealers cannot "pyramid" late charges (that is, add a late charge onto a payment made in full and on time when the only delinquency was a late charge on a previous installment).
  - **FTC Privacy Rule:** Dealers must issue notices of their privacy policies to their finance and lease customers and, in some cases, when the dealer discloses nonpublic information about consumers to third parties. The rule also restricts disclosures of nonpublic personal information. Dealers who correctly use a FTC model privacy notice receive safe harbor protection for the language used to describe their privacy policy.

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- **FTC prohibition against deceptive and unfair trade practices:** Prohibits unfair and deceptive trade practices. For example, the FTC has found certain advertising practices to be deceptive, including recent claims that the dealer will "pay off" what consumers owe on a trade-in vehicle.
- **NHTSA (National Highway Traffic Safety Administration) odometer rule:** Prohibits odometer removal or tampering and misrepresentation of odometer readings. Requires record keeping to create a "paper trail," and odometer disclosures on titles. Vehicles with a greater than 16,000-lb. gross vehicle weight rating and those 10 model years old or older are exempt.
- **Truth in Lending and Consumer Leasing Acts:** Regulations Z and M cover consumer credit and consumer leasing transactions, respectively, specifying information to be disclosed to a consumer before completing the transaction, and information to be disclosed when advertising consumer credit transactions or leases. For example, dealers who advertise a lease down payment or monthly payment amount must disclose in lease ads that the advertised deal is a lease; the total amount due at lease signing; number, amount, and period (for example, monthly) of payments; and whether a security deposit is required.

SALES

- **CUSTOMER NOTICES**
  - **DOE/EPA gas-mileage guide:** Dealers must make this guide available to prospective new vehicle buyers upon request. The guide is available to download from www.fueleconomy.gov, as is the NADA brochure *Green Checkup: Maintenance Tips to Help You Save Gas* from www.nada.org.
  - **EPA emissions certification:** Dealers must provide a form to new-vehicle customers certifying a vehicle's compliance with emissions standards.
  - **FTC Used Car Rule:** "Buyer's Guides" are required on used vehicle side windows, disclosing make, model, year, vehicle identification number (VIN), whether offered "as is" or with a warranty (and, if so, what kind of warranty), and service contract availability. Guides must warn that all promises should be in writing. For sales conducted in Spanish, the "Buyer's Guide" and the required cross-reference in the sales contract must be in Spanish.
  - **FTC Written Warranty Rule:** Dealers must display warranties near products or post signs in prominent places telling consumers that copies of the warranties are available for review.
  - **Magnuson-Moss Act:** Dealers must give consumers certain required information on warranties and limited warranties.

MARKETING

- **ADVERTISING**
  - **FTC prohibition against deceptive and unfair trade practices:** Prohibits unfair and deceptive trade practices. For example, the FTC has found certain advertising practices to be deceptive, including recent claims that the dealer will "pay off" what consumers owe on a trade-in vehicle.
  - **FTC guidelines for fuel-mileage advertising and alternative-fuel-vehicle advertising and labeling:** Dealer and manufacturer fuel-economy advertisements must state that the numbers are estimates and come from EPA; alternative-fuel vehicles must be properly labeled.

- **Truth in Lending and Consumer Leasing Acts:** Regulations Z and M cover consumer credit and consumer leasing transactions, respectively, specifying information to be disclosed to a consumer before completing the transaction, and information to be disclosed when advertising consumer credit transactions or leases. For example, dealers who advertise a lease down payment or monthly payment amount must disclose in lease ads that the advertised deal is a lease; the total amount due at lease signing; number, amount, and period (for example, monthly) of payments; and whether a security deposit is required.

- **CUSTOMER COMMUNICATION**
  - **CAN-SPAM (Controlling the Assault of Non-Solicited Pornography and Marketing) Act:** E-mailers must identify a commercial message as an advertisement or solicitation and provide their postal addresses and a mechanism to opt out of future commercial e-mails. If recipients opt out, senders must stop sending them commercial e-mail within 10 business days. The disclosure requirements don't apply to e-mails that relate to transactions or relationships, such as for warranty or recall-repair issues or the completion of transactions requested by the consumer. No one may send commercial e-mails to wireless devices unless recipients provide express prior authorization to receive them. So that senders can recognize wireless addresses, the FCC maintains a list of wireless domain names at http://transition.fcc.gov/cgb/policy/DomainNameDownload.html. Commercial e-mailers must check the list monthly. (Additional provisions prohibit deceptive headers, misleading subject lines, and other spam tactics). A text message may also be considered an e-mail and therefore subject to the CAN-SPAM Act if it is sent to an e-mail address—that is, if it has an Internet domain name after the "@" symbol (whether the e-mail address is displayed or not). This means that no commercial text message (deemed to be an e-mail), may be sent to a wireless device without "express prior authorization." Merely having an "established business relationship" with the recipient is not enough.
  - **FTC Door-to-Door Sales Rule:** Gives consumers a three-day "cooling off" period for sales not consummated at the dealership. Does not apply to auctions, tent sales, or other temporary places of business if the seller has a permanent place of business.
  - **FTC Privacy Rule (Gramm-Leach-Bliley Act):** Dealers must issue notices of their privacy policies to their finance and lease customers and, in some cases, when the dealer discloses nonpublic information about consumers to third parties. The rule also restricts disclosures of nonpublic personal information. Dealers who correctly use a FTC model privacy notice receive safe harbor protection for the language used to describe their privacy policy.
  - **FTC prohibition against deceptive and unfair trade practices:** Prohibits unfair and deceptive trade practices. For example, the FTC has found certain advertising practices to be deceptive, including recent claims that the dealer will "pay off" what consumers owe on a trade-in vehicle.
  - **FTC Telemarketing Sales Rule (TSR):** Imposes many of the Telephone Consumer Protection Act (TCPA) restrictions (see below) on dealers who telemarket across state lines. Requires dealers who sell, or obtain payment authorization for, goods or services during interstate phone calls to abide by the prohibition against numerous deceptive and abusive acts and to maintain certain records for 24 months. An amendment to the rule prohibits prerecorded telemarketing calls without a consumer's express written agreement, requires such calls to provide a key-press or voice-activated opt-out

mechanism at the outset of the calls, and requires the calls to ring for 15 seconds or four rings before disconnecting.

- **Junk Fax Prevention Act:** Makes revisions to the TCPA by requiring the fax sender to have an established business relationship (EBR) with a fax recipient and must have the recipient provide the fax number voluntarily. These revisions make it illegal to send unsolicited advertisements via fax without the recipient's consent but allows for fax advertisements to be sent to a recipient under an EBR as long the fax number is voluntarily provided by the recipient.
- **Telephone Consumer Protection Act (TCPA):** Imposes numerous restrictions on telemarketing, including the national and company-specific do-not-call (DNC) rules, calling-time restrictions, caller ID requirements, fax advertising rules, and restrictions on the use of auto-dialers and prerecorded messages. Fax ads may be sent only to authorized recipients and must include a phone number, fax number, and toll-free opt-out mechanism (each available 24/7) on the first page of the fax ad. The FCC considers text messages to be "phone calls" under the TCPA. This means a text message "solicitation" cannot be sent to a phone number on either the national DNC list (subject to the "established business relationship" and "prior express permission" exemptions to the national DNC rules) or a company-specific DNC list (to which there are no exemptions); and no text message whatsoever can be sent to a cellular telephone number—solicitation or not, whether the number is on a DNC list or not—using an "automated dialer system" unless the called consumer's "prior express written consent" has been given.

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Appendix B: Interview Framework Document

NADA INTERVIEW FRAMEWORK				
Profile				
Dealership Name				
Full Time Employee Equivalent (2012)				
Annual Total Gross Sales (2012)				
No. of Franchises/Makes At Location				
Other rooftops/franchises owned?				
No. of New and Used Units Sold (2012)				
Regulatory Category	**General Description**	**Cost Category Description**	**Cost Estimate**	**Specific Mandates Falling Within Each Category**
General - HR Manager, General Manager, Owner/Principal				
Employee Relations	Rules on relationship between dealership and employees (e.g., proper hiring, non-discrimination policies and procedures, employment eligibility (I-9 form), minimum-wage, overtime, and equal pay compliance, posting of Federal notices (Wage-Hour, ADA, EEOC, FLSA, etc.) unionizing activities, and disabled employee accommodations.	**Compensation** -Human resources, departmental and business office time devoted to compliance. -Manager and employee compliance training. -Drafting/maintenance of compliance policies and procedures. -Record-keeping for payroll, training, and other required documents and for obtaining and maintaining postings.		**Americans with Disability Act:** protections and accommodations for employees with disabilities. **Employee Discrimination:** protections against discrimination based on age, sex, race, ethnicity and other protected classes. **Employment Eligibility Verification**: Pre-hiring determination of employment eligibility of candidates. **Wage/Hour:** rules governing minimum wage, overtime, equal pay, recordkeeping, employment of minors, Worker classification. **National Labor Relations Act**: Rules governing unionization.
		Contractors -Payments to third-party trainers, fees paid for off-site classes, etc. -Payments made to lawyers and consultants to understand and comply with mandates.		
		Capital Asset Investments -Equipment purchased to accommodate employees with physical disabilities or limitations (e.g., ergonomic chairs, desks, and office equipment, amplified telephones, etc.)		

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Regulatory Category	General Description	Cost Category Description	Cost Estimate	Specific Mandates Falling Within Each Category
General - HR Manager, General Manager, Owner/Principal				
Employee Benefits	Rules on employee benefits, such as family, medical, and military service leave, health insurance, and retirement.	**Compensation** -Human resources, departmental, and business office time devoted to determining eligibility for mandated benefits and for compliance. -Manager and employee compliance training. -Drafting/maintenance of compliance policies and procedures. -Record-keeping activities -Obtaining/displaying informational posters		**Consolidated Omnibus Budget Reconciliation Act (COBRA):** Health coverage continuation for certain terminated workers. **Family and Medical Leave Act (FMLA):** Up to 12 weeks unpaid, job-protected family, medical or military-related leave. **Employee Retirement Income Security Act (ERISA):** Must provide employees with certain information about retirement plans, keep records, and follow policies and procedures. **Health Insurance Portability and Accountability Act (HIPAA):** May not discriminate based on pre-existing conditions. **Uniformed Services Employment and Reemployment Rights Act (USERRA):** Service member leave and reemployment rights.
		Contractors -Payments to consultants, lawyers, etc. to assist in determining/meeting compliance.		
Facilities	Americans with Disabilities Act rules on public-accessibility and employee accommodation.	**Contractors** -Payments to consultants, lawyers, etc. to assist in determining/meeting compliance.		**Americans with Disability Act:** Rules on public-accessibility and employee accommodation.
		Capital Equipment -Building, modifying and maintaining workplace accessibility (e.g., ramps, restrooms, etc.)		

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Regulatory Category	General Description	Cost Category Description	Cost Estimate	Specific Mandates Falling Within Each Category
General - HR Manager, General Manager, Owner/Principal				
Business Administration	Rules related to record-retention, workplace posters, customer information protection, cash reporting, and OFAC sales prohibitions.	**Compensation**-Business office time devoted to record retention and related costs (i.e., digitizing., record query, etc.), establishing procedures, training, complying with identify theft prevention, cash transaction reporting, and OFAC customer eligibility.		**Mandatory Workplace Posters:** Array of federal regulations mandating posters in the workplace. **Miscellaneous record-keeping requirements**: Variety of mandates to create, retain, and sometimes report records.**Electronic Records Retention:** Specific federal procedures for keeping records electronically. **FTC Safeguards Rule (Gramm-Leach-Bliley Act):** Must develop, implement, maintain, and regularly audit a comprehensive customer information security program. **IRS Cash Reporting Rule:** Use of form 8300 to report receipt of cash and equivalents in excess of $10,000 per transaction or in two or more related transactions. **Office of Foreign Assets Control (OFAC) restrictions:** Monitor list of specially designated organizations and individuals to avoid entering into prohibited transactions.
		Contractors **Payments to:** -Third-party trainers or class fees. -Third-party record retainer or destruction firms. -Consultants advise on proper procedures -Third-party vendors to verify customer eligibility to purchase goods and services.		
		Capital Equipment -Investments in equipment for in-house record retention (hard drives, computers).		
Accounting	Rules related to account for corporate and payroll taxes, and for other mandates such as for repossessions and child support liens.	**Compensation** -Primarily controller and general business office time spent on accounting.		**General Corporate and Payroll Tax Compliance:** Rules governing corporate taxes and collection and remittance of payroll taxes. **Federal child-support:** Monitor and comply with child support liens. **FTC Repo Rule:** Accounting for proceeds from repossession dispositions.
		Contractors -Payments to external accounting services for assistance on compliance with corporate and payroll tax mandates and other accounting issues.		
Emergency Planning	Rules on emergency planning and responding to employee injuries and other emergencies.	**Compensation** **Time Spent:** -Developing an emergency response plan. -Training employee(s) on first aid.		**OSHA Blood-Borne Pathogens Rule**: Preparation/distribution of exposure control plan if more than four minutes from emergency care. Training of employees on first aid rule. **Emergency-Response Planning:** Develop plan to address response strategies during emergency situations.
		Contractors -Payments to third-party trainers, for outside class fees, and for consultants used to develop an emergency response plan.		

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Regulatory Category	General Description	Cost Category Description	Cost Estimate	Specific Mandates Falling Within Each Category
Service & Body Shop: Service/Body Shop Manager, General Manager, Owner/Principal				
Environmental	Rules governing management of emissions and wastes to protect air, land and water resources.	**Compensation** **Time spent:** -Training and certifying use of environmentally-safer products and procedures. -Acquiring necessary permits. -Establishing proper environmental management policies and procedures.		**Clean Air Act:** Rules on fueling, auto refinishing, solvent cleaning, vehicle emissions inspection and maintenance, fuels and fuel additives, mobile air conditioning, and emissions tampering. **Clean Water Act:** Rules on waste water storage and disposal (e.g., floor drain management, sewage discharge pre-treatment, storm water management, possible class V well permits). **Resource Conservation and Recovery Act (RCRA):** Rules on proper management of hazardous and non-hazardous wastes (e.g., used oils, antifreeze, spray booth filters, solvents, wipes and rags, oil water separator sludge, anti-freeze, tires, batteries). Proper management of underground and above-ground storages tanks and containers. **Superfund:** Rules governing liability for wastes sent off site. Possible community right-to-know reporting.
		Contractors Payments to: -Third-party trainers or class fees -Off site waste management companies. -On site environmental services companies.		
		Capital Equipment: **Investments in:** -Environmental compliance equipment (e.g., HVLP guns, enclosed gun cleaners, used oil space heaters, enhanced paint booths, oil water separators, refrigerant recyclers, storage tank improvements, etc.).		
		Supplies -Spill and leak clean up materials -Storage drums -Shipping Papers -Labels -Environmentally friendly solvents and paints		

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Regulatory Category	General Description	Cost Category Description	Cost Estimate	Specific Mandates Falling Within Each Category
Service & Body Shop: Service/Body Shop Manager, General Manager, Owner/Principal				
Employee Health and Safety	Rules to promote employee health and safety and proper hazardous materials management.	**Compensation:** -Management and employee time spent training on health and safety policies and procedures. -Employee time spent implementing health and safety compliance strategies. -Management time spent compiling necessary OSHA records.		**DOT Hazardous Materials Handling**: Educate employees on proper packaging, handling, storage, and shipping of hazardous materials. **Asbestos Standards:** Procedures to minimize employee exposure to asbestos and other air borne dusts. **Hazard Communications Standard:** Develop written hazardous communication plan, inventory chemicals, collect/maintain safety data sheets, ensure proper labeling, and train employees on hazardous chemicals. **Lock-out/Tag-out procedures:** Develop/implement LOTO plan, train employees, inspect machinery for possible LOTO risks. **Respiratory Protection Standard**: Develop/implement written program on how to select, use and maintain appropriate respiratory protection. **Other workplace health and safety standards:** Vast array of other employee health and safety standards.
		Contractors Payments for: -Third-party trainers or class fees. -Health and safety consultants.		
		Capital Equipment -Health and safety equipment including: eye-washes, fireproof cabinets, non-slip surfaces, railings, body/service department ventilation, adequate lighting, fire suppression, dust control.		
		Supplies -Personal and respiratory protective equipment. -Lock out tag out supplies. -Filters. -Anti-sparking drop lights. -Compliant packaging of hazardous materials. -Fireproof-cabinets. -Etc.		
Vehicle Safety	Restrictions on safety system alterations and tampering and labeling/reporting mandates.	**Compensation** **Time spent:** -Training service employees to recognize signs of tampering. -Ensuring compliance with labeling requirements -Properly managing recalled parts		**NHTSA Alteration Rule**: Affix labels upon installation of non-readily attachable components on new vehicles. **NHTSA Safety Belt/Air Bag Deactivation**: Rules governing air bag deactivation/switch installation and seat belt replacement. **NHTSA Tampering Rules**: Vehicle service and repair should be conducted so as to preserve the performance of applicable federal motor vehicle safety standards. **NHTSA Tire Regulations**: Rules governing sales of defective tires, recalled tires management, tire placards, etc.
		Supplies: -Obtain and use labels as necessary.		

Regulatory Category	General Description	Cost Category Description	Cost Estimate	Specific Mandates Falling Within Each Category
Sales: Sales Manager, General Manager, Owner/Principal				
Customer Notices	Vehicle sales rules governing customer notices, written warranties, mileage guides, emissions certifications, used vehicle buyer's guides, etc.	**Compensation** **Time spent:** -Affixing used car buyers' guides. -Providing fuel economy guides on request. -Posting warranty availability notice and providing warranty information upon request. -Training employees on compliance strategies -Providing the EPA emissions certification.		**DOE/EPA Fuel Economy Guide:** Download, print, and provide fuel economy guide upon request. **EPA emissions certification:** Provide EPA emissions certification with each light-duty sale. **FTC Used Car Rule (Buyer Guides):** Post buyers guides on all light-duty used vehicles and include warranty terms in sales contracts. **Magnuson-Moss Act and Written Warranty Rule:** Governs terms of warranties and service contracts given and the availability of warranty information prior to purchase.
		Supplies -Printing or purchasing used car buyer guides and copies of written warranties -Print or purchase copies of EPA emissions certification.		
Regulatory Category	**General Description**	**Cost Category Description**	**Cost Estimate**	**Specific Mandates Falling Within Each Category**
Vehicle Financing: Finance Manager, General Manager, Owner/Principal				
Administrative	Protections against credit discrimination, identity theft, and credit report misuse.	**Compensation** **Time spent:** -Training employees on proper finance related policies and procedures. -Ensuring compliance with retention and disposal of credit applications and reports. -Developing, implementing and maintaining a program to protect customer information security.		**Equal Credit Opportunity Act:** Prohibitions against credit applicant discrimination and rules on gathering, evaluating and retaining credit information. **Fair Credit Reporting Act:** Restricts the use of credit reports, the furnishing of information to consumer reporting agencies, and the sharing of information with affiliates. **Red Flags Rule:** Requires dealers to develop and implement a written identity theft prevention program containing procedures to identify, detect, and respond to identity theft "red flags." **Other FACT Act:** Consumer fraud alerts, address discrepancy notices, credit card truncation, etc. **Safeguards Rule (Gramm-Leach-Bliley)**: Must develop, implement, and maintain a program to protect the security of customer information.
		Contractors **Payments to:** -Vendors for accessing credit reports. -Third-parties for training or classes. -Vendors for physical or electronic record storage and destruction. -Vendors for assistance with customer information security program.		

Regulatory Category	General Description	Cost Category Description	Cost Estimate	Specific Mandates Falling Within Each Category
Vehicle Financing: Finance Manager, General Manager, Owner/Principal				
Customer Notices	Vehicle financing rules mandating customer notices for a variety of information on transactions, credit reports, odometer readings, and privacy.	**Compensation** **Time spent:** -Issuing Adverse Action Notices. -Explaining to customers why credit applications are denied. -Issuing credit score disclosure exception notices. -Providing point-of-sale lending disclosures. -Completing/providing required privacy notices. -Obtaining and providing used vehicle odometer disclosures using federally compliant forms and time spent retaining disclosure documents. -Ensuring proper language in credit/lease documents and advertisements.		**Equal Credit Opportunity Act:** Requirement that written notices be provided to credit applicants explaining credit denials. **Fair Credit Reporting Act**: Notices to consumers, job applicants, and employees for adverse actions based on credit reports. **FTC Credit Practices Rule:** Written disclosures to co-signers and prohibitions on unfair credit/co-signer practices and the pyramiding of late charges. **FTC Privacy Rule (Gramm-Leach-Bliley):** Must issue privacy notices to finance and lease customers if disclosures of non-public consumer information to third parties. Rules encourage use of model FTC privacy notice. **FTC Prohibition against deceptive/unfair trade practices:** Wide array of restrictions on unfair and/or deceptive activities. **NHTSA Odometer Rules:** Requirement that most vehicle transfers be accompanied by an odometer disclosure. **Truth in Lending and Consumer Leasing Act:** Regulations Z and M specify information to be disclosed to consumers prior to completing credit or lease transactions. **Dodd-Frank Financial Reform:** Disclosure rules for risk-based pricing and adverse actions notices.
		Contractors **Payments to:** -Vendors for adverse action notices. -Third parties for training class fees.		
		Supplies -Printing or purchasing required customer notices.		

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Regulatory Category	General Description	Cost Category Description	Cost Estimate	Specific Mandates Falling Within Each Category
Marketing: Sales Manager, General Manager, Owner/Principal				
Advertising	Rules prohibiting advertising and marketing of deceptive information.	**Compensation** **Time spent:** -Ensuring advertisements contain required disclosures and meet federal Unfair and Deceptive Acts and Practice (UDAP) standards.		**FTC prohibition against deceptive/unfair trade practices:** Restrictions on a wide array of unfair and deception advertising practices. **FTC Guidelines for Fuel Economy Advertising:** Fuel economy ads must state that mileage numbers are EPA-based estimates. **Truth in Lending and Consumer Leasing Act:** Mandatory guidelines for ensuring proper lease and credit sales disclosure guidelines.
		Contractors **Payments to:** -Consultants to vet ads for "trigger terms" and other compliance concerns.		
Customer Communication	Restricted dealer-customer communications.	**Compensation** **Time spent:** -Providing consumers with communication opt-out opportunities. -Verifying wireless devices receive communications only after obtaining express written consents. -Training employees on various communications and marketing restrictions. -Maintaining company-specific Do Not Call lists and complying with the national list.		**CAN-SPAM:** Restrictions on commercial email messages to wireless and non-wireless devices. **FTC Privacy Rule (Gramm-Leach-Bliley Act):** Must issue privacy notices to finance and lease customers if dealer discloses non-public consumer information to third parties (rules encourage use of model FTC privacy notice). **FTC Telemarketing Sales Rule**: Rules govern array of deceptive and abusive acts involving interstate marketing phone calls. Prohibits pre-recorded telemarketing phone calls without consent. **Junk Fax Prevention Act:** Preserves established business relationship basis for sending faxes to businesses and consumers, imposes opt-out notice requirement, and requires that faxes only be sent to numbers voluntarily provided. **Telephone Consumer Protection Act:** Numerous telemarketing (calls and texts) rules including national do-not-call rules, calling time restrictions, caller ID requirements, and restrictions on use of auto-dialers and prerecorded messages.
		Contractors **Payments to:** -IT consultants and vendors to set up and track opt-outs and firewalls between business units and third-parties. -Third-parties for accessing Do Not Call lists and verifying potential contacts not on the list. -Third-parties for scrubbing phone contact lists of mobile phones.		

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Appendix C: Model Output

Regression Output

Dependent Variable: REV/REV(-1)

Method: Least Squares

Sample (adjusted): 1979 2012

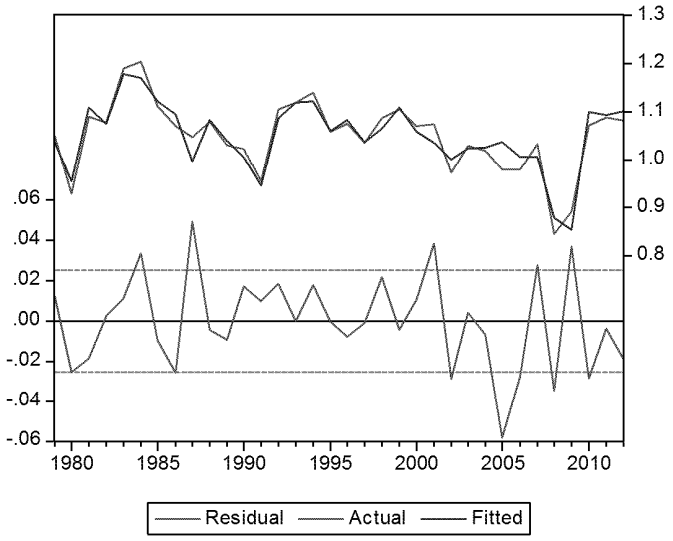
Included observations: 34 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
VPRICE/VPRICE(-1)	0.605652	0.158460	3.822118	0.0006
(DPRICE)/DPRICE(-1)	0.469819	0.233027	2.016158	0.0531
(VEH)/VEH(-1)	0.715271	0.049068	14.57701	0.0000
UNEMP	-0.006698	0.003075	-2.178370	0.0377
C	-0.740157	0.190004	-3.895469	0.0005

R-squared	0.900085	Mean dependent var	1.050480
Adjusted R-squared	0.886303	S.D. dependent var	0.074949
S.E. of regression	0.025272	Akaike info criterion	-4.383195
Sum squared resid	0.018521	Schwarz criterion	-4.158730
Log likelihood	79.51432	Hannan-Quinn criter.	-4.306646
F-statistic	65.31147	Durbin-Watson stat	2.373179
Prob(F-statistic)	0.000000		

The variables the research team tested but did not include in the final model due to multi -collinearity and autocorrelation include: real motor vehicle output, BAA corporate bond yield, CPI-all item, dealership expenses, real GDP growth rate, personal income excluding transfer receipts, dealership net profit, household net worth, and average new vehicles sold per dealership. Figure 2 shows the actual and fitted data, as well as the residuals.

Figure 2: Model Estimation—Actual and Fitted Data and Residuals



Appendix D: Government Studies Summary

Regulation	Description of Regulation Applicable to Automobile Dealers	Regulatory Evaluation Cost Estimate	Cost Estimate in 2009 Dollars[1]	Cost Estimate Specification
Affordable Care Act	Extensive health-care reforms enacted in 2010 affect dealerships and their health-care plans. For example, large dealerships (with more than 50 full-time employees) must decide by January 1, 2014, whether they will offer health coverage that meets the federal requirements or pay a penalty. Many other reporting, record keeping, and other duties will apply to dealerships and other business. For more information, visit www.healthreform.gov.			
Air Contaminant Standards	Provide protective permissible exposure limits regulated by OSHA.	✓	$21	Estimated annual incremental costs of 1989 amendments to automotive dealers and service stations industries.
Americans With Disabilities Act[2]	Title III Prohibits discrimination against the physically handicapped in areas of public accommodation. Must make reasonable accommodations to facilities, such as installing ramps and accessible parking spaces, drinking fountains, public toilets and doors. Dealerships with 15 or more employees must reasonably accommodate disabled workers and job applicants.	✓	$411.3	Estimated net present value (negative) from cost/benefit analysis of incremental costs of 2008 amendments, using 1991 rules as a baseline, to single level stores. Single level stores category includes retail establishments assumed to be inclusive of automobile dealerships.
CAN-SPAM Act	E-mailers must identify a commercial message as an advertisement or solicitation and provide their postal addresses and a mechanism to opt out of future commercial e-mails. If recipients opt out, senders must stop sending them commercial e-mail within 10 business days. No one may send commercial e-mails to wireless devices unless recipients provide express prior authorization to receive them.			

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Regulation	Description of Regulation Applicable to Automobile Dealers	Regulatory Evaluation Cost Estimate	Cost Estimate in 2009 Dollars[1]	Cost Estimate Specification
Clean Air Act	National paint and hazardous air-pollution rules require reformulated, environmentally safer paints and finishes, special handling procedures, and record keeping.	✓	$5,473	Estimated annual cost in 2010. Inclusive of laws in place as of 2005. 1/5 emission source categories estimated in study - non-electricity generating units, industrial point sources. This category includes sources such as boilers, cement kilns, process heaters, and turbines.
Clean Water Act	Sets standards for regulation of wastewater and storm water at dealerships and comprehensive rules governing aboveground oil storage tanks.	✓	$18,063	Estimated total annual costs to economy as of 1994, projected to 1997 using a 3% discount rate.
COBRA (Consolidated Omnibus Budget Reconciliation Act)	Requires dealerships with 20 or more employees to continue health-care coverage for ex-employees and their families for 18 to 36 months, depending on circumstances.			
Comprehensive Environmental Response, Compensation, and Liability Act	Dealers must closely monitor waste disposal to avoid liability, requirement to accept waste oil from do-it-yourselfers.			
Dodd-Frank Financial Reform Law	Dealers who engage in BHPH financing, are subject to the newly created Consumer Financial Protection Bureau. The Dodd-Frank law also created several new obligations for creditors, including new disclosure requirements for risk-based pricing and adverse-action notices under the Fair Credit Reporting Act. .			
DOE/EPA gas-mileage guide	Dealers must make this guide available to prospective new vehicle buyers upon request free of charge in either electronic or paper form.			
DOT hazardous-materials-handling procedures	Require parts employees who load, unload, and package hazardous products, such as airbags, batteries, and brake fluid, to be trained in safe handling practices.			
Electronic records retention	Revenue Procedure 98-25 explains the IRS requirements for retaining computerized accounting records			

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Regulation	Description of Regulation Applicable to Automobile Dealers	Regulatory Evaluation Cost Estimate	Cost Estimate in 2009 Dollars[1]	Cost Estimate Specification
Emergency-response planning	Federal laws require dealers to have emergency-response plans.			
Employee Discrimination Rules	Bars employment discrimination on the basis of race, sex, color, religion, or national origin. Prevents employers from asking job applicants certain questions (such as age, marital status, or childbearing plans). Prohibits workplace sexual harassment, including behavior that creates a hostile work environment.			
Employee Verification Rules	Dealerships must verify the employment eligibility of prospective new employees using I-9 form and proper support documentation.			
Employment Retirement Income Security Act	Dealers offering retirement or health plans must, among other things, provide employees with plan information, keep records, abide by fiduciary responsibilities, and establish a grievance and appeals process.			
EPA emissions certification	Dealers must provide a form to new vehicle customers certifying a vehicle's compliance with emissions standards.			
EPA hazardous-waste rules, Resource Conservation and Recovery Act (RCRA)	Comprehensive environmental law regulating many dealership functions, including underground storage tanks and the storage, management, and disposal of used oil, antifreeze, mercury products, and hazardous wastes.	✓	$5,362	Estimated annual costs to economy. Not inclusive of Clean Water Act, initial capital costs, and considers rules promulgated between 1986 and 2003.

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Regulation	Description of Regulation Applicable to Automobile Dealers	Regulatory Evaluation Cost Estimate	Cost Estimate in 2009 Dollars[1]	Cost Estimate Specification
Equal Credit Opportunity Act	Regulation B prohibits discrimination in credit transactions based on race, gender, color, marital status, religion, national origin, age, and public-assistance status. The dealer/creditor is required both to notify applicants in a timely fashion of actions taken on, and reasons for, denying applications, and to retain certain records.			
FACT Act of 2003	Amendment to the Fair Credit Reporting Act. Significantly increased dealer responsibilities to customers engaging in credit transactions. Also increased dealer responsibilities to help combat identity theft.			
Fair Credit Reporting Act	Restrictions on credit report access and information sharing. Dealer requirements if adverse action is taken based on customer credit.			
Family and Medical Leave Act	Dealerships must post a notice informing employees of their right to take up to 12 weeks of unpaid, job protected leave per year for personal and family related medical emergencies, and must comply with appropriate requests for such leave. Special provisions apply to leave related to military service.			
Federal child-support enforcement regulations	Requires states to govern liens on personal property - including vehicles - for overdue child support. Dealerships should check that child-support liens don't exist on used cars, and must place liens on wages of employees who are delinquent on child support programs.			

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Regulation	Description of Regulation Applicable to Automobile Dealers	Regulatory Evaluation Cost Estimate	Cost Estimate in 2009 Dollars[1]	Cost Estimate Specification
Federal wage-hour and child labor laws	Addresses minimum wage and overtime pay standards and exemptions, as well as standards for employing minors, including teen driving restrictions.			
FTC Credit Practices Rule	Dealers are required to provide a written disclosure statement to a cosigner before the cosigner signs an installment sales contract. Dealers cannot "pyramid" late charges (that is, add a late charge onto a payment made in full and on time when the only delinquency was a late charge on a previous installment).			
FTC Door-to-Door Sales Rule	Gives Consumers a three day "cooling off" period for sales not consummated at the dealership. Does not apply to auctions, tent sales, or other temporary places of business if the seller has a permanent place of business.			
FTC guidelines for fuel-mileage advertising and alternative- fueled vehicle advertising and labeling	Dealer and manufacturer fuel-economy advertisements must state that the numbers are estimates and come from EPA; alternative-fueled vehicles must be properly labeled.			
FTC Privacy Rule[3]	Dealers must issue notices of their privacy policies to their finance and lease customers and, in some cases, when the dealer discloses nonpublic information about consumers to third parties. The rule also restricts disclosures of nonpublic personal information.	✓	$106.6	Estimated annual costs to all financial institutions subject to the Federal Trade Commission's jurisdiction. Financial institutions defined uniquely to include various entities with access to customer information.
FTC prohibition against deceptive and unfair trade practices	Prohibits dealers from engaging in deceptive and unfair trade practices.			
FTC Repossession Rule	Requires formal accounting of money collected for repossessed vehicles.			

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Regulation	Description of Regulation Applicable to Automobile Dealers	Regulatory Evaluation Cost Estimate	Cost Estimate in 2009 Dollars[1]	Cost Estimate Specification
FTC Safeguards Rule	Dealers must develop, implement, maintain, and regularly audit, a comprehensive, written security program to protect customer information.			
FTC Telemarketing Sales Rule	Requires dealers who sell, or obtain payment authorization for, goods or services during interstate phone calls to abide by the prohibition against numerous deceptive and abusive acts and to maintain certain records for 24 months. Prohibits prerecorded telemarketing calls without a consumer's express written agreement, requires such calls to provide opt-out mechanism at the outset of the calls, and requires minimum call length before hang up.			
FTC Used Car Rule	"Buyer's Guides" are required on used-vehicle side windows, disclosing make, model, year, VIN, whether offered "as is" or with a warranty (and, if so, what kind of warranty), and service contract availability. Guides must warn all promises should be in writing. For sales conducted in Spanish, the "Buyer's Guide and the required cross-references in the sales contract must be in Spanish.			
FTC Used Parts Guide	Prohibits misrepresentation that a part is new or about the condition, extent of previous use, reconstruction, or repair of a part. Previously used parts must be clearly and conspicuously identified as such in advertising and packaging, and, if the part appears new, on the part itself.			

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Regulation	Description of Regulation Applicable to Automobile Dealers	Regulatory Evaluation Cost Estimate	Cost Estimate in 2009 Dollars[1]	Cost Estimate Specification
FTC Written Warranty Rule	Dealers must display warranties near products or post signs in prominent places telling consumers that copies of the warranties are available for review.			
General Corporate and Payroll Tax Compliance	Transactional cost burden associated with the recordkeeping, calculation, and filing of dealership Federal corporate and payroll taxes			
Gramm-Leach-Bliley Act	Protects customer information from foreseeable threats in security and data integrity. Governs the collection, disclosure, and protection of customers nonpublic personal information.			
Health Insurance Portability and Accountability Act	Generally prohibits health insurers from denying coverage to workers who lose or change jobs and bars insurers from excluding coverage for preexisting conditions for more than a year. Dealerships cannot discriminate based on pre-existing conditions or current health status and must allow employees to enroll in new plans, given they meet certain requirements.	✓	$797	Estimated annual cost to health care insurers.
IRS Cash-Reporting Rule	Dealers receiving more than $10,000 in cash in one transaction or in two or more related transactions must file IRS/FinCEN Form 8300 with the IRS within 15 calendar days and must provide written notice that the report was filed to the person named on the report by January 31 of the following year. "Cash" includes certain cashier's checks, traveler's checks, money orders, and bank drafts.			

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Regulation	Description of Regulation Applicable to Automobile Dealers	Regulatory Evaluation Cost Estimate	Cost Estimate in 2009 Dollars[1]	Cost Estimate Specification
IRS/DOL worker classification	When making decisions about worker classification dealers must carefully assess whether the worker is an employee or independent contractor.			
Magnuson-Moss Act	Dealers must give consumers certain required information on warranties and limited warranties.			
Mandatory workplace posters	Requirement to inform employees of certain employment-related rights.			
Miscellaneous record-keeping requirements	A multitude of requirements govern the length of time records must be maintained.			
NHTSA alteration and tire-placarding rules	Labeling and registration rules. Rules for handling and disposal of recalled new and used tires.			
NHTSA odometer rule	Prohibits odometer removal or tampering and misrepresentation of odometer readings. Requires record keeping to create a "paper trail", and odometer disclosures on titles. Vehicles with a greater than 16,000-lb. gross vehicle weight rating and those 10 model years old or older are exempt.			
NHTSA safety belt/airbag deactivation	Dealerships may install airbag switches for consumers with NHTSA authorization. Dealerships must be responsive to consumer requests for rear-seat lap/shoulder safety belt retrofits in older vehicles.			
NHTSA tampering rules	Prohibits dealerships from rendering inoperative safety equipment installed on vehicles in compliance with federal law.			

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Regulation	Description of Regulation Applicable to Automobile Dealers	Regulatory Evaluation Cost Estimate	Cost Estimate in 2009 Dollars[1]	Cost Estimate Specification
NHTSA tire regulations	Rule requires proper replacement or modification of the tire-information label when replacing tires or adding weight before first sale or lease. Also, consumers must be given registration cards when buying new tires or tires must be registered electronically. Other rules govern handling and disposal.			
NLRB Regulations	National Labor Relations Board rules governing unionization activities, including employee rights, election rules, postings, unfair labor practices, and others.			
OFAC restrictions	Dealerships may not enter into transactions with certain sanctioned countries, governments, and specially designated organizations and individuals, including those appearing on and electronic list maintained by OFAC.			
OSHA asbestos standards	Dealerships must use certain procedures during brake and clutch inspections and repairs to minimize workplace exposure. Water, aerosol cleaners, or brake washers may be used to comply with the standard.	✓	$23.6	$8,212,701 in estimated annual incremental costs to automotive remanufacturing and auto repair industry for 1986 amendments to revise standards, $15,437,858 in estimated annual incremental costs to automotive repair industry for 1994 amendments to revise 1986 standards.
OSHA Blood-Borne Pathogens Rule	Dealerships more than four minutes from an emergency health facility must have a program to respond to employees who suffer cuts. All dealerships should have proper first-aid kits.	✓	$1,190	$1,150,421,211 total costs for 1991 rule and $40,461,109 incremental annual costs for 2001 standards revision. Costs applicable to healthcare, education, correctional and waste management industries.

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Regulation	Description of Regulation Applicable to Automobile Dealers	Regulatory Evaluation Cost Estimate	Cost Estimate in 2009 Dollars[1]	Cost Estimate Specification
OSHA Hazard Communication Standard	Dealers must inform employees about chemical hazards they may be exposed to in the workplace, keep chemical product information sheets on-site and accessible, and train staffers to properly handle the hazardous materials they work with. Recent revisions require retraining employees by December 1, 2013.	✓	$32.6	Incremental costs of 2012 amendments. $8,307,813 in annual costs and $24,339,072 annually during 4 year phase in ending 6/1/16. Costs applicable to vehicle and parts dealers, repair and maintenance, automotive body, paint, and interior repair and maintenance industries.
OSHA lock-out/tag-out procedures	Procedures for service departments to ensure machines, including vehicles, are safely disengaged before being serviced.			
OSHA Respiratory Protection Standard	Development and implementation of a written program addressing how to select, properly apply, and maintain respirators, to protect body shop workers from hazardous chemicals.			
OSHA workplace health and safety standards	Extensive regulations covers multitude of workplace issues and practices, from hydraulic lift operation to the number of toilets required.	✓	$45,627	Total cost estimate for economy.
Powered Industrial Truck Operator Training	Regulation intended to reduce the number of injuries and deaths that occur as a result of inadequate operator training. Applies to all industries in which the trucks are being used, except agricultural operations.	✓	$0.07	Annual incremental costs of 1998 amendments. Automotive dealers and service stations industries.
Resource Conservation and Recovery Act (RCRA)	Comprehensive environmental law regulating many dealership functions, including underground storage tanks and the storage, management, and disposal of used oil, antifreeze, mercury products, and hazardous wastes.	✓	$100.80	Annual incremental costs to economy of 1984 amendments.

Regulation	Description of Regulation Applicable to Automobile Dealers	Regulatory Evaluation Cost Estimate	Cost Estimate in 2009 Dollars[1]	Cost Estimate Specification
Telephone Consumer Protection Act	Imposes numerous restrictions on telemarketing, including the national and company-specific do-not-call (DNC) rules, calling-time restrictions, caller ID requirements, fax advertising rules, and restrictions on the use of auto dialers and prerecorded messages.			
Truth in Lending and Consumer Leasing Acts	Regulations Z and M cover consumer credit and consumer leasing transactions, respectively, specifying information to be disclosed to a consumer before completing the transaction, and information to be disclosed when advertising consumer credit transactions or leases.			
Uniformed Services Employment and Reemployment Rights Act (USERRA)	Protects service members' reemployment rights when returning from a period of service in the uniformed services, including those called up from the reserves or National Guard, and prohibits employer discrimination based on military service or obligation.			

1. Cost estimates converted to 2009 dollars using Bureau of Economic Analysis implicit price deflator for gross domestic product. In millions of dollars.
2. Employee discrimination rules applicable in this category, but not included costs.
3. Gramm-Leach-Bliley applicable in this category, but not included in costs.

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Appendix E: Bibliography

Bailey et al. "Mind the gap! Comparing *ex ante* and *ex post* assessments of the costs of complying with environmental regulation." *Environmental Policy and Governance* 12, no. 5 (Sept/Oct 2002). pp. 245-256.

Eisenberry, Ross and Shapiro, Isaac. "Deconstructing Crain and Crain: Estimated cost of OSHA regulations is way off base." *Economic Policy Institute Issue Brief* no. 312 (22 Aug 2011).

Hahn, Robert, and Dudley Patrick. "How Well Does the U.S. Governm ent Do Benefit -Cost Analysi s?" *Review of Environmental Economics and Policy*. no. 2 (2007). pp. 192-211.

Hammitt, James. "Are The Costs of Proposed Environmental Regulation s Overestimated? Evidence from the CFC Phaseout." *Environmental and Resource Economics* 16, no. 3 (July 2000). pp. 281-302.

Harvey S. James Jr., "Estimating OSHA Compliance Costs," *Policy Sciences* 31, (1998). pp. 321-341.

Harrington et al. "On the Accuracy of Regulatory Cost Estimates." *Journal of Policy Analysis and Management* 19, no. 2 (2000). pp. 297-322.

"Hazard Communication, Final Rule," 77 *Federal Register* 58 (26 March 2012). pp. 17574-17896.

Hill, Kim, Debbie Maranger Menk and Joshua Cregger. "Assessment of Tax Revenue Generated by the Automotive Sector." Center for Automotive Research. (April 2012).

National Automobile Dealers Association. "NADA Data: State of the Industry Report." (2013).

National Automobile Dealers Association. "The Regulatory Maze: NADA's Annual Update on Federal Regulations." (2012)

"Occupational Exposure to Bloodborne Pathogens; Needlestick and Other Sharps Injuries; Final Rule," 66 *Federal Register* 12 (18 January 2001). pp. 5318-5325.

Office of Information and Regulatory Affairs. "2008 Report to Congres s on the Benefits and Costs of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities." (January 2009).

Office of Information and Regulatory Affai rs. "2013 Draft Report to Cong ress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act." (April 2013).

Robert S. Raucher and John Cromwell, "Safe Drinking Water Act: Costs of Compliance," Working Paper. Mercatus Center, George Mason University. Working Paper 35.

"Standards of Privacy of Individually Identifiable Health Information, Final Rule," 65 *Federal Register* 250 (28 December 2000). pp. 82462-82829.

Thompson et al. "Validating Benefit and Cost Estimates: The Case of Airbag Regulation." Risk Analysis 22, no.4 (4 Oct 2002). pp. 803-811.

U.S. Department of Justice, Disability Rights Section of the Civil Rights Division . *Final Regulatory Impact Analysis of the Final Revised Regulations Implementing T itles II and II I of the ADA, Including Revised ADA Standards for Accessible Design.* (23 July 2010).

U.S. Department of Labor, Occupational Safety and Health Administration. Air Contaminants, Section 7 – VII. Feasibility and Regulatory Analyses. 54 *Federal Register* (5 July 1989). pp. 28154.

U.S. Department of Labor, Occupational Safety and Health Administra tion. Hazard Communication. 77 *Federal* Register (25 May 2012). pp. 17573-17896.

U.S. Department of Labor, Occupational Safety and Health Administration . Occupational Exposure to Asbestos, Section 4 – IV. Final Regulatory Impact and Regulatory Flexibility Analysis . 60 *Federal Register* (29 June 1995). pp. 33973.

U.S. Department of Labor, Occupational Safety and Health Administration . Occupational Exposure to Asbestos, Tremolite, Anthrolphyllite, and Actinolite, Section 3 – III. Regulatory Analysis . 53 *Federal Register* (14 September 1988). pp. 35609.

U.S. Department of Labor, Occupational Safety and Health Administration . Occupational Exposure to Bloodborne Pathogens, Section 7 – VII. Regulatory Impact and Regulatory Flexibility Analysis. 57 *Federal Register* (6 December 1991). pp. 64004.

U.S. Department of Labor, Occupational Safety and Health Administration . Powered Industrial Truck Operator Training, Section 1 0 – X. Summary of the Final Economic Analysis, Including the Regulatory Flexibility Analysis. 63 *Federal Register* (1 December 1998). pp. 66237.

U.S. Environmental Protection Agency, Office of Air and Radiation . *The Benefits and Costs of the Clean Air Act from 1990 to 2020, Final Report – Rev. A.* (April 2011).

U.S. Environmental Protection Agency, Office of Solid Waste . *Economic Analysis of Resource Conservation and Recovery Act Regulations for Small Quantity Generators.* (June 1985).

U.S. Environmental Protection Agency, Office of Water, Office of Policy, Economics, and Innovation. *A Retrospective Assessment of the Costs of the Clean Water Act: 1972 to 1997.* (October 2000).

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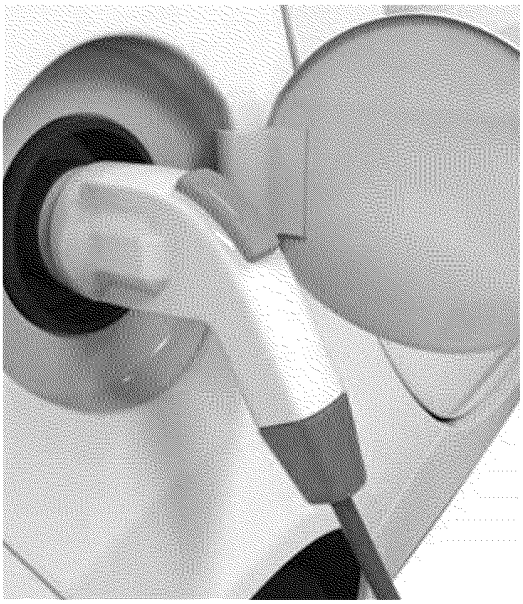
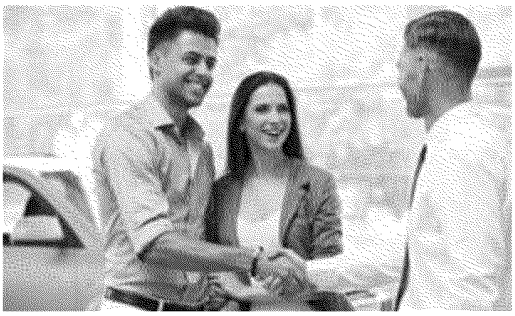
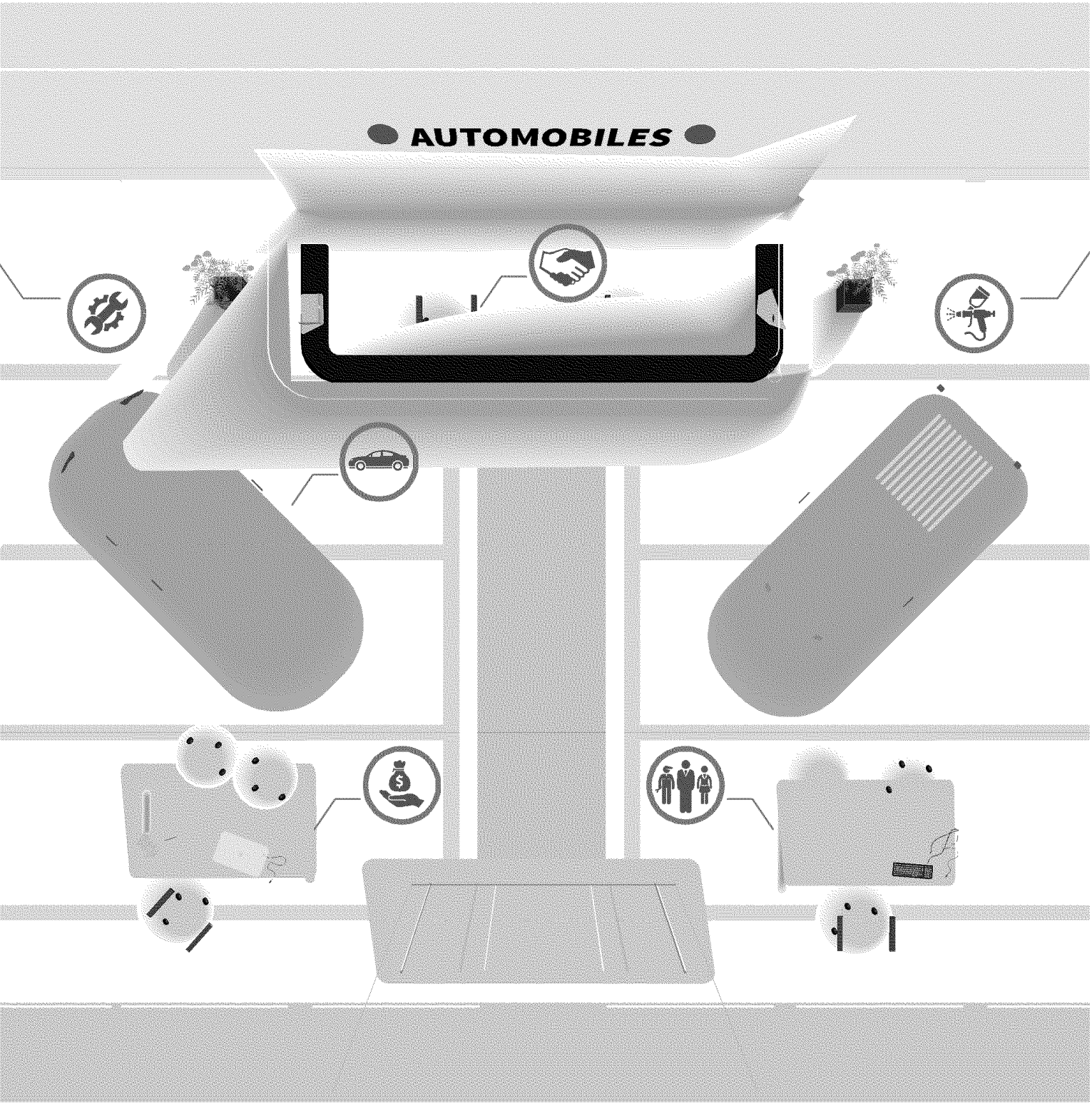
NADA's Annual Update on Federal Regulations







THE REGULATORY MAZE

Our annual list of major federal regulations; state and local laws also apply and sometimes include additional requirements.

All Departments (General Management/Personnel)

- [redacted] Acquirements

All Departments (Customer)

- Americans With Disabilities Act
- CAN-SPAM Act
- Driver's Privacy Protection Act
- Electronic Funds Transfer Act
- FTC Privacy Rule
- FTC prohibition against deceptive and unfair trade practices
- FTC Safeguards Rule
- FTC Telemarketing Sales Rule
- FTC Warranty Rules
- IRS Cash-Reporting Rule
- Magnuson-Moss Act
- OFAC restrictions
- Telephone Consumer Protection Act
- USA PATRIOT Act

Body Shop

- Clean Air Act
- EPA hazardous-waste rules
- OSHA Hazard Communication Standard
- OSHA Respiratory Protection Standard
- OSHA workplace health and safety standards
- UNICAP
- VIN and parts marking

F&I Department

- Dodd-Frank Financial Reform Law
- Equal Credit Opportunity Act
- Fair Credit Reporting Act
- FACT Act of 2003
- FTC Credit Practices Rule
- FTC Holder-in-Due-Course Rule
- Gramm-Leach-Bliley Act
- Producer-Owned Reinsurance Companies
- Truth in Lending and Consumer Leasing Acts

New- and Used-Vehicle Sales Departments

- American Automobile Labeling Act
- CAFE and GHGs Rules
- Diplomat vehicle purchases
- DOE/EPA gas-mileage guide
- Federal bankruptcy law
- FTC Door-to-Door Sales Rule
- FTC guidelines for fuel-mileage advertising and alternative-fueled-vehicle advertising and labeling
- FTC Used Car Rule
- Gray-market vehicles
- IRS treatment of salesperson incentives
- LIFO inventory accounting method
- Heavy-highway-vehicle excise tax
- Motor vehicle tax credits
- Monroney sticker (Price Labeling Law)
- NHTSA alteration and tire-placarding rules
- NHTSA odometer rule
- NHTSA recall regulations
- NHTSA safety belt/airbag deactivation
- NHTSA tire regulations
- School van sales
- UNICAP

Service and Parts Department

- Clean Air Act
- Clean Water Act
- DOT hazardous-materials-handling procedures
- FTC Used Parts Guide
- IRS Core Inventory Valuation
- LIFO/FIFO inventory accounting method
- NHTSA tampering rules
- NHTSA tire rules
- OSHA asbestos standards
- OSHA Hazard Communication Standard
- OSHA lock-out/tag-out procedures
- OSHA workplace health and safety standards
- RCRA
- Safe Drinking Water Act
- Superfund
- UNICAP

IN ADDITION TO THIS LIST OF FEDERAL LAWS AND REGULATIONS, be sure to consult nada.org/regulatoryaffairs for more details.

All Departments (General Management/Personnel)

- Affordable Care Act: Extensive health-care reforms enacted in 2010 affect dealerships and their health-care plans. For example, most large dealerships (with more than 50 full-time employees) must have decided by January 1, 2015, whether they will offer health coverage that meets the federal requirements or pay a penalty. Many additional reporting, record-keeping and other duties apply to dealerships and other businesses. For more information, visit healthcare.gov.
- Age Discrimination in Employment Act: Protects older individuals against age-based employment discrimination.
- Americans With Disabilities Act (ADA): Dealerships with 15 or more employees must reasonably accommodate disabled workers and job applicants.
- Consolidated Omnibus Budget Reconciliation Act (COBRA): Requires dealerships with 20 or more employees to continue health-care coverage for ex-employees and their families for 18 to 36 months, depending on circumstances.
- Electronic deposit of taxes: Dealerships having more than a de minimis amount of aggregate depository taxes generally must deposit through the Electronic Federal Tax Payment System.
- Electronic records retention: Revenue Procedure 98-25 explains the IRS requirements for retaining computerized accounting records.
- Emergency-response planning: Federal, state and local laws require dealers to have emergency-response plans.
- Employee drug testing: Unionized dealerships must bargain with unions before implementing employer drug policies (not necessary for pre-employment drug testing). The ADA prohibits employers from discriminating against employees or applicants who have completed or are currently undergoing a drug treatment program, as long as they aren't currently abusing drugs.
- Employee Polygraph Protection Act: Prohibits dealerships from using polygraphs in pre-employment screening; allows use in limited cases where an employee is reasonably suspected of a workplace incident involving economic loss to the employer.
- Employee Retirement Income Security Act (ERISA): Dealers offering retirement or health plans must, among other things, provide employees with plan information, keep records, and abide by fiduciary responsibilities and other obligations.
- Employment Verification Rules: Dealerships must verify the employment eligibility of prospective new employees using I-9 form and proper support documentation. Use of E-verify is optional.
- Equal Pay Act: Prohibits wage discrimination on basis of sex.
- Estate tax: The top rate was 40 percent on amounts over 5.45 million (for individuals) in 2016, and increased to $5.49 million in 2017.
- Family and Medical Leave Act: Dealerships must post a notice informing employees of their right to take limited, unpaid leave for personal and family medical emergencies and must comply with appropriate requests for such leave. Special provisions apply to leave related to military service. Dealerships must display the revised Family and Medical Leave Act poster from February 2013.
- Federal child-support enforcement regulations: Requires states to govern liens put on personal property—including vehicles—for overdue child support. Dealerships should check that child-support liens don't exist on used cars, and must place liens on wages of employees who are delinquent on child-support payments.
- Federal Civil Rights Act: Bars employment discrimination on the basis of race, sex, color, religion or national origin. Prevents employers from asking job applicants certain questions (such as age, marital status or childbearing plans). Prohibits workplace sexual harassment, including behavior that creates a hostile work environment.
- FTC Repossession Rule: Requires formal accounting of money collected for repossessed vehicles.
- Federal wage-hour and child labor laws: Address minimum-wage and overtime pay standards and exemptions as well as standards for employing minors, including teen driving restrictions. Federal minimum wage is $7.25 per hour; state minimum wage rates may be higher.
- Genetic Information Nondiscrimination Act: Prohibits discrimination based on health-related employee DNA information.
- Health Insurance Portability and Accountability Act: Generally prohibits health insurers from denying coverage to workers who lose or change jobs and bars insurers from excluding coverage for pre-existing conditions for more than a year.
- IRS/DOL worker classification: Dealers must determine whether their workers are employees or independent contractors. The IRS and the Department of Labor use multi-factor legal standards and tests to evaluate this question. When making worker classification decisions, dealerships should be careful, conser-

vative and prepared to document their decisions. Of greatest importance: the level of control employers exercise over workers as measured by the means and manner of the work performed. The IRS Voluntary Classification Settlement Program is aimed at encouraging employers to admit past worker misclassifications.

- IRS treatment of demo vehicles: Revenue Procedure 2001-56 offers dealers alternative methods for determining the value of demo use by qualified salespeople and other dealership employees. It defines what constitutes limited personal use and streamlines record-keeping requirements.

- IRS treatment of tool plans: Tool and equipment plans for service technicians and other employees must comply with the IRS's requirements for business connection, substantiation and return of excess payment.

- Mandatory workplace posters: Notices, such as "Your Rights Under the FMLA," "Equal Employment Opportunity Is the Law," "Federal Minimum Wage" and "Notice: Employee Polygraph Protection Act," must be conspicuously displayed. Dealerships must display the revised Federal Minimum Wage and the Employee Polygraph Protection Act (EPPA) posters from August 2016.

- Mental Health Parity Act: Requires insurers and health plans to offer mental illness coverage comparable to that for physical illness. Group health plans may not set dollar limits on mental health care lower than limits for general medical and surgical services. Nothing requires dealerships to provide mental health coverage, and certain exemptions apply.

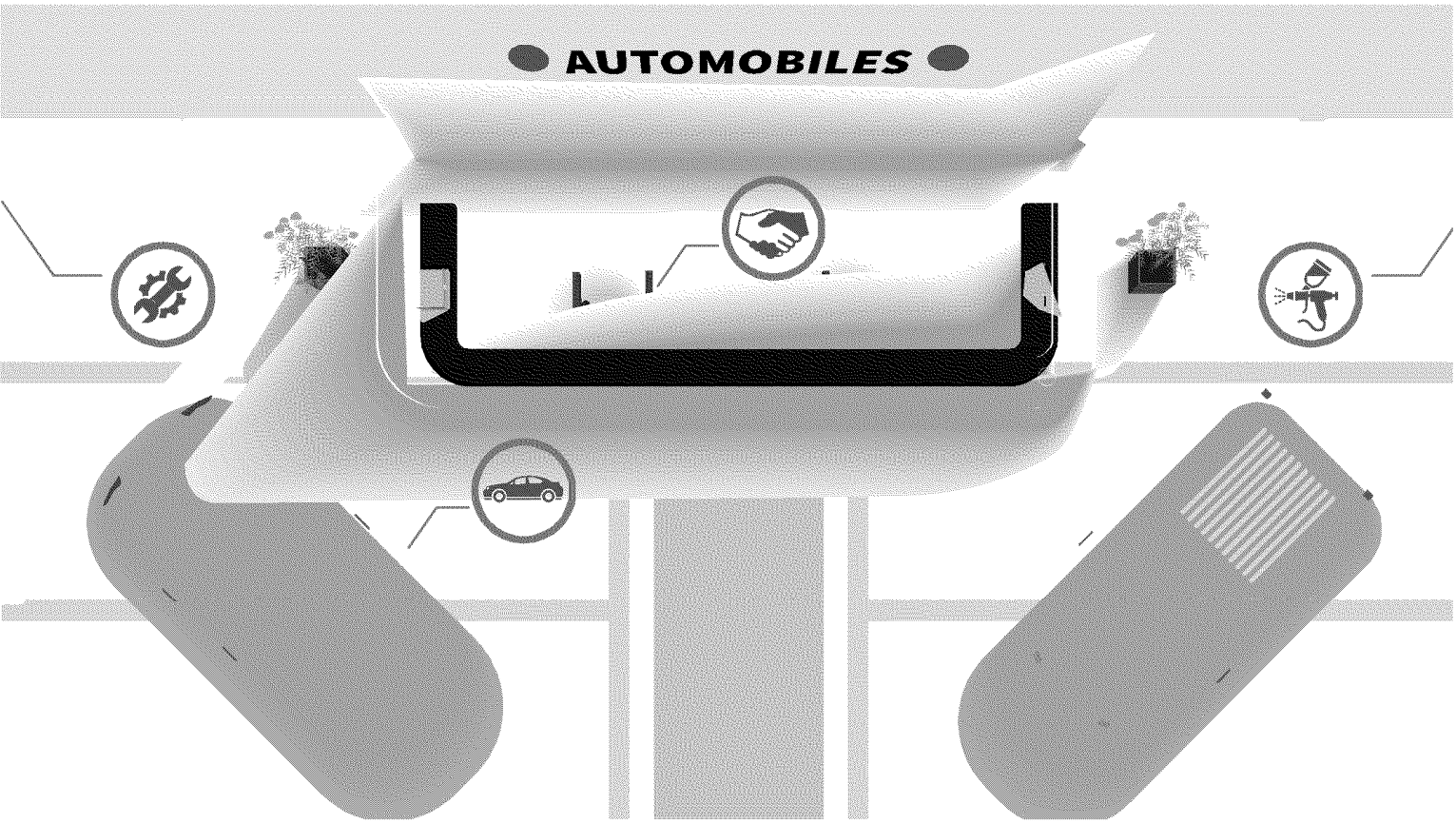
- Miscellaneous record-keeping requirements: A multitude of requirements govern the length of time records must be maintained. Examples: Personal and corporate income tax records must be kept at least three years; notification forms for underground storage tanks must be kept indefinitely; and copies of Form 8300 cash reports must be kept for five years.

- Newborns' and Mothers' Health Protection Act: Employers and insurers must provide minimum hospital-stay benefits.

- National Labor Relations Board (NLRB) unionization rules: Govern unionization activities, including employee rights, election rules, postings, unfair labor practices and others.

- OSHA Blood-Borne Pathogens Rule: Dealerships more than four minutes from an emergency health facility must have a program to respond to employees who suffer cuts. All dealerships must have adequate first-aid kits.

- OSHA injury and illness recording and reporting requirements: Dealers with 10 or more employees are required to maintain a yearly log of work-related injuries and illnesses on OSHA Form 300. Dealers must also complete a report on each workplace injury or illness that occurs using OSHA Form 301. Even if no injuries or illnesses have occurred in a calendar year, all dealers with more than 10 employees must fill out and post an annual summary of work-related injuries and illnesses on OSHA Form 300A. Dealers must also report the following events to OSHA: all work-related fatalities; all work-related inpatient hospitalization of one or more employees; all work-related amputations; and all work-related



losses of an eye. Starting in 2017, heavy-duty truck dealerships with 20 to 249 employees per establishment must electronically submit to OSHA, OSHA Form 300A. Both heavy-duty truck and light-duty car dealerships with more than 250 employees per establishment must electronically submit to OSHA, OSHA Form 300, OSHA Form 300A and OSHA Form 301 starting in 2017.

- Section 89 of the Tax Reform Act: Dealerships are prohibited from discriminating against lower-paid employees in their employee benefits packages.
- Section 179 expensing: Generally, businesses can expense qualified Section 179 property, subject to phaseout. Until further notice, the total Section 179 deduction limitation is $500,000. The bonus depreciation provisions are extended to 2019, with a 50 percent level for 2016 and 2017, 40 percent for 2018 and 30 percent for 2019.
- Uniformed Services Employment and Reemployment Rights Act (USERRA): Governs the employment and reemployment rights of members of the U.S. uniformed services.
- Worker Adjustment and Retraining Notification Act (WARN): Dealerships must give 60 days' notice to workers before termination or store closings under certain circumstances.

All Departments (Customer)

- Americans With Disabilities Act (ADA): Prohibits discrimination against the physically handicapped in areas of public accommodation. Must make reasonable accommodations to facilities, such as by installing ramps and accessible parking spaces, drinking fountains, public toilets and doors.
- CAN-SPAM (Controlling the Assault of Non-Solicited Pornography and Marketing) Act: E-mailers must identify a commercial message as an advertisement or solicitation and provide their physical postal addresses and a mechanism to opt out of future commercial e-mails. If recipients opt out, senders must stop sending them commercial e-mail within 10 business days. The disclosure requirements don't apply to e-mails that relate to transactions or relationships, such as those containing exclusively warranty information or recall-repair messages, or messages related to the completion of transactions requested by the consumer. No one may send commercial e-mails to wireless devices unless recipients provide express prior authorization to receive them. So that senders can recognize wireless addresses, the FCC maintains a list of wireless domain names at transition.fcc.gov/cgb/policy/DomainName Download.html. Commercial e-mailers must check the list monthly. (Additional provisions prohibit deceptive headers, misleading subject lines and other spam tactics.)

A text message may also be considered an e-mail and therefore subject to the CAN-SPAM Act if it is sent to an e-mail address—that is, if it has an Internet domain name after the "@" symbol (whether the e-mail address is displayed or not). This means that no commercial text message (deemed to be an e-mail), may be sent to a wireless device without "express prior authorization." Merely having an "established business relationship" with the recipient is not enough.

- Driver's Privacy Protection Act: Denies access to personal information in state motor vehicle records except for limited purposes, such as driver safety, theft and recalls. Also restricts the release or use of personal info for marketing.
- Electronic Funds Transfer Act (EFTA): EFTA and its implementing "Regulation E" govern a variety of electronic transactions. Certain provisions of Regulation E apply directly to any "person" that engages in certain activities or transactions, regardless of whether the person is a financial institution. Examples of such transactions include: issuing access devices (such as debit cards, personal identification numbers [PINs] or payroll cards); issuing or selling gift cards; initiating electronic check conversions; preauthorizing electronic fund transfers; or operating ATMs.
- FTC Privacy Rule: Dealers must issue notices of their privacy policies to their finance and lease customers and, in some cases, to consumers when the dealer discloses nonpublic information about consumers to third parties. The rule also restricts disclosures of nonpublic personal information and requires dealers to contractually limit their service providers' access to and use of that information. Dealers who correctly use a FTC model privacy notice receive safe-harbor protection for the language used to describe their privacy policy.
- FTC prohibition against deceptive and unfair trade practices: Section 5 of the FTC Act prohibits unfair and deceptive trade practices. For example, the FTC has found certain advertising practices to be deceptive, including recent safety inspection claims related to used vehicles that are subject to open safety recalls.
- FTC Safeguards Rule: Dealers must develop, implement and maintain—and regularly audit—a comprehensive, written security program to protect customer information and must ensure that their service providers provide similar safeguards.
- FTC Telemarketing Sales Rule (TSR): Imposes many of the TCPA restrictions (below) on dealers who telemarket across state lines. Requires dealers who sell, or obtain payment authorization

for, goods or services during interstate phone calls to abide by the prohibition against numerous deceptive and abusive acts and to maintain certain records. Prohibits prerecorded telemarketing calls without a consumer's express written agreement, requires such calls to provide a key-press or voice-activated opt-out mechanism at the outset of the calls, and requires the calls to ring for 15 seconds or four rings before disconnecting.

- FTC Warranty Rules: Pursuant to Mag-Moss, the FTC has issued two rules governing written warranties. The "Disclosure Rule" provides disclosure requirements for written warranties, specifies language for certain disclosures and requires simple language in a single document. The "Pre-Sale Availability Rule" details the methods by which warrantors and sellers must provide warranty terms before a sale. The recently passed E-Warranty Act allows warrantors to comply by posting warranty terms to an Internet website, as long as the warrantor also provides consumers with a non-Internet-based method to obtain warranty terms, and allows sellers to use electronic methods to provide consumers with warranty terms pre-sale.

- IRS Cash-Reporting Rule: Dealers receiving more than $10,000 in cash in one transaction or in two or more related transactions must file IRS/FinCEN Form 8300 with the IRS within 15 calendar days and must provide written notice that the report was filed to the person named on the report by January 31 of the following year. "Cash" includes certain cashier's checks, traveler's checks, money orders and bank drafts.

- Magnuson-Moss Act: Dealers must give consumers certain required information on warranties and limited warranties. Dealers are also generally prohibited from requiring routine service to be performed at their dealership as a condition of a used-car warranty.

- Office of Foreign Assets Control (OFAC) restrictions: Dealerships may not enter into transactions with certain sanctioned countries, governments, and specially designated organizations and individuals. Dealers should check the electronic list maintained by OFAC to ensure compliance.

- Telephone Consumer Protection Act (TCPA): Imposes numerous restrictions on telemarketing, including the national and company-specific do-not-call (DNC) rules, calling-time restrictions, caller ID requirements, fax advertising rules, and restrictions on the use of autodialers and prerecorded messages. Fax ads may be sent only to authorized recipients and must include a phone number, fax number and toll-free opt-out mechanism (each available 24/7) on the first page of the fax ad.

The FCC considers text messages to be "phone calls" under the TCPA. This means you cannot send a text message "solicitation" to a phone number on either the national DNC list (subject to the "established business relationship" and "prior express permission" exemptions to the national DNC rules) or your company-specific DNC list (to which there are no exemptions). See additional text message restrictions under "CAN-SPAM Act."

Requires express written consent prior to any prerecorded or auto-dialed telemarketing call to a cell phone or text message. Recent FCC guidance indicates a very broad view of what is an "auto-dialed" call or a text message. You cannot send any text message whatsoever to a cellular telephone number—solicitation or not, whether the number is on a DNC list or not—using an "autodialer" unless you have the called consumer's "prior express consent."

- USA PATRIOT Act: Dealers must search their records and provide information about individuals or entities with whom they conducted transactions or created accounts if requested by the federal Financial Crimes Enforcement Network. Dealers are temporarily exempt from the law's anti-money-laundering program requirements.

New- and Used-Vehicle Sales Departments

- American Automobile Labeling Act: New cars and light trucks must have a domestic-parts content label showing percentage of U.S. or Canadian parts; countries contributing more than 15 percent of the parts; origin of engine and transmission; and location of vehicle assembly. Dealers must ensure that labels remain on vehicles until sold.

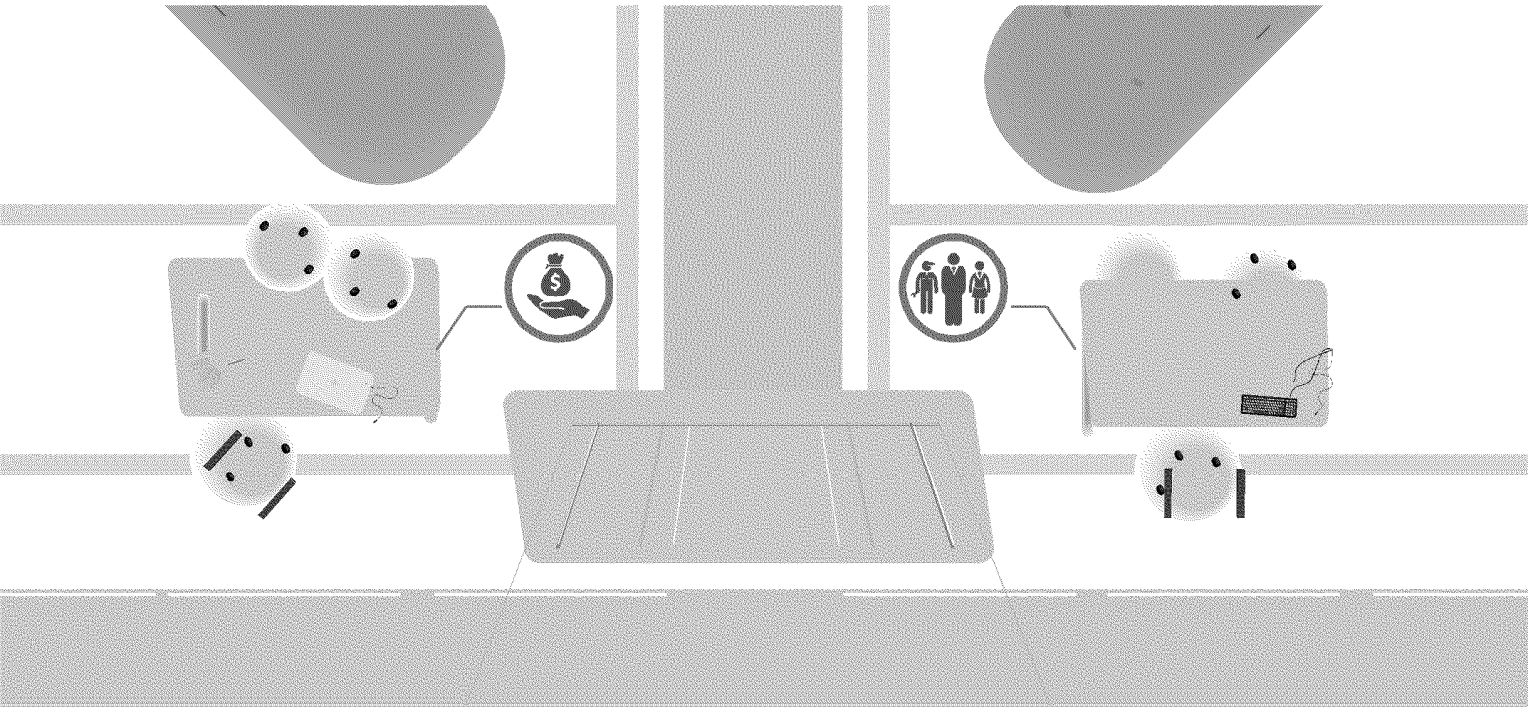
- Corporate Average Fuel Economy (CAFE) and Greenhouse Gases (GHGs) Rules: NHTSA and EPA rules on CAFE and GHGs govern the fuel-economy performance of all light, medium-duty and heavy-duty vehicles, which affects their design, performance and cost. The rules also impact the use of alternative technologies and fuels.

- Diplomat vehicle purchases: The State Department's Office of Foreign Missions must approve a diplomat's vehicle purchase before that diplomat's tax exemption request may be honored.

- DOE/EPA gas-mileage guide: Dealers must make this guide available to prospective new-vehicle buyers upon request. Download the guide from fueleconomy.gov.

- Federal bankruptcy law: Dealerships should perfect security interests within 30 days after a customer takes possession of a vehicle, regardless of state law. Otherwise, if the customer files for bankruptcy within 90 days of when the financing agreement is signed, the bankruptcy trustee may avoid the lien. Dealerships failing to perfect liens in a timely manner may be liable for any loss.

- FTC Door-to-Door Sales Rule: Gives consumers a three-day "cooling off" period only for sales not consummated at the dealership. Does not apply to auctions, tent sales or other temporary places of business if the seller has a permanent place of business.
- FTC guidelines for fuel-mileage advertising and alternative-fueled-vehicle advertising and labeling: Dealer and manufacturer fuel-economy advertisements must state that the numbers are estimates and come from EPA; alternative-fueled vehicles must be properly labeled.
- FTC Used Car Rule: "Buyers Guides" are required on all used vehicles offered for sale, disclosing whether the vehicle is offered "as is" or with a dealer warranty, other non-dealer warranty disclosures and service contract availability. Dealers must use FTC required form Buyers Guide. Note that a new version of the Buyers Guide was adopted in 2016. Dealers must use the new version of the Buyers Guide by January 27, 2017, but dealers may use their remaining stock of Buyers Guides for one year.
- Gray-market vehicles: EPA, Department of Transportation and Customs restrict the importation/sale of vehicles lacking safety or emissions certification.
- IRS treatment of salesperson incentives: Factory incentives paid directly to salespeople are not wages for tax purposes.
- LIFO (last-in/first-out) inventory accounting method: The use of the LIFO inventory method requires complianc with the conformity requirement.
- Heavy-highway-vehicle excise tax: A 12 percent excise tax generally applies to the first retail sale of (1) truck chassis and bodies with a gross vehicle weight rating (GVWR) in excess of 33,000 lb. (Class 8); (2) truck trailer and semitrailer bodies with a GVWR in excess of 26,000 lb. (Classes 7 and 8); and (3) "highway tractors," unless they have a GVWR of 19,500 lb. or less (Class 5 and under) and a gross combined weight rating of 33,000 lb. or less. Dealers selling Class 5 vehicles with more than 33,000-lb. gross combined weight rating or Classes 6 or 7 vehicles should apply the "primary design" test to determine if a vehicle is a taxable tractor or a nontaxable truck.
- Motor vehicle tax credits: Consumers may be eligible for up to a $7,500 personal federal tax credit when they buy a qualifying plug-in electric vehicle or dedicated electric vehicle at a dealership ("EV Tax Credit"). Eligibility for the EV Tax Credit is based on a taxpayer's income and tax status.
- Monroney sticker (Price Labeling Law): Dealerships must keep stickers on new passenger cars showing the manufacturer's suggested retail price, plus other costs, such as options, federal taxes, and handling and freight charges. Stickers also include EPA's revised fuel-economy information and NHTSA NCAP revised crash-test star ratings. Dealerships that alter covered vehicles must attach a second label adjacent to the Monroney label, stating, "This vehicle has been altered. The stated star ratings on the safety label may no longer be applicable." No size or form of this label is specified, only that it be placed as close as possible to Monroney labels on automobiles that (1) have been altered by the dealership and (2) have test results posted.
- National Highway Traffic Safety Administration (NHTSA) alteration and tire-placarding rules: Significantly altered new vehicles must have labels affixed identifying the alterations and stating that they meet federal safety and theft standards. Tire-placarding and -relabeling rules require a new tire information placard/label whenever parts or equipment are added that may reduce a vehicle's cargo-carrying capacity, or when replacement tires differ in size or inflation pressure from those referred to on the original.



- NHTSA odometer rule: Prohibits odometer removal or tampering and misrepresentation of odometer readings. Requires record keeping to create a "paper trail," and odometer disclosures on titles. Vehicles with a greater than 16,000-lb. gross vehicle weight rating and those 10 model years old or older are exempt.
- NHTSA recall regulations: New vehicles and parts held in inventory that are subject to safety recalls must be brought into compliance before delivery.
- NHTSA safety belt/airbag deactivation: Dealerships may install airbag switches for consumers with NHTSA authorization. Dealerships must be responsive to consumer requests for rear-seat lap/shoulder safety belt retrofits in older vehicles.
- NHTSA tire regulations: Rule requires proper replacement or modification of the tire-information label when replacing tires or adding weight before first sale or lease. Also, consumers must be given registration cards when buying new tires or tires must be registered electronically. Other rules govern handling and disposal of recalled new and used tires.
- School van sales: Dealers may not sell, lease or give away large, new passenger vans with more than 10 seating positions if they know the vehicle will be used to transport students to or from school or school activities. Schools must purchase or lease a school bus or multifunction school activity bus for such purposes.
- Uniform capitalization (UNICAP): Dealers who (1) "produce" property or (2) acquire it for resale if their average annual gross receipts over the three preceding tax years exceed $10 million must comply with the UNICAP requirements contained in Section 263A of the Internal Revenue Code. Revenue Procedure 2010-44 creates two safe-harbor methods of accounting, which dealers may elect by filing Form 3115 with the IRS, that generally permit dealers to expense, instead of capitalize, all handling and storage costs at certain dealership facilities.

F&I Department

- Dodd-Frank Financial Reform Law: Comprehensive legislation enacted in July 2010 created a new, independent Consumer Financial Protection Bureau and granted it unprecedented authority to regulate financial products and services. Dealers engaged in three-party financing are excluded from the authority of the bureau and remain subject to regulation by the Federal Reserve Board, the Federal Trade Commission (which has been given streamlined authority to declare dealer practices as unfair or deceptive) and state consumer protection agencies. Finance sources, including dealers who engage in BHPH financing, are subject to the bureau's jurisdiction. The Dodd-Frank law also created several new obligations for creditors, including additional disclosure requirements for risk-based pricing and adverse-action notices under the Fair Credit Reporting Act (Section-1100F). Plus, it contains a requirement to collect, report to the federal government, retain, and make available to the public upon request certain data collected in credit applications from small, women-owned and minority-owned businesses. Dealers are temporarily exempt from this requirement pending promulgation of specific regulations.
- Equal Credit Opportunity Act (ECOA): Regulation B prohibits discrimination in credit transactions based on race, sex, color, marital status, religion, national origin, age and public-assistance status. The government interprets this prohibition as applying not just to intentional discrimination, but also to credit practices that result in a negative "disparate impact" on consumers based on one of these prohibited factors. The Consumer Financial Protection Bureau (CFPB) addressed disparate impact discrimination in March 2013 guidance to indirect auto lenders (CFPB Bulletin 2013-02). In addition, the dealer/creditor is required both to notify applicants in a timely fashion of actions taken on—and reasons for denying—applications, and to retain certain records. (See also "Dodd-Frank Financial Reform Law," above, for a description of new small-business loan data collection requirements.) An optional ECOA compliance program template is available to dealers at nada.org/faircredit.
- Fair Credit Reporting Act (FCRA): Dealers are restricted in their use of credit reports for consumers, job applicants and employees. Credit reports generally may be obtained only pursuant to consumers' written instructions or if consumers initiate a business transaction (not if they merely talk with salespeople). Dealers must give job applicants and employees a separate document informing them that a credit report may be obtained and must obtain prior, written authorization to access the report. Dealers generally may not share credit information with affiliates unless they give consumers notice and the opportunity to opt out. If dealers take adverse action based on the report, they must notify consumers and follow additional procedures with job applicants and employees.
- Fair and Accurate Credit Transactions (FACT) Act of 2003: This law significantly amended FCRA by adding several identity-theft prevention and other duties. Duties include: responding to requests for records from victims of ID theft and to fraud and active-duty alerts on credit reports; disposal requirements for credit report information; opt-out disclosure formatting requirements for prescreened credit solicitations; truncating the expi-

ration date and all but the last five digits on electronically printed credit and debit card receipts provided to purchasers at the point of sale; the Federal Reserve's Regulation FF restrictions on obtaining, using and sharing "medical information" in credit transactions; the FTC Red Flags Rule, which requires creditors and financial institutions to develop and implement a written Identity Theft Prevention Program that contains procedures to identify, detect and respond to "red flags" indicating the possibility of identity theft; the FTC Address Discrepancy Rule, which requires users of credit reports to develop and implement procedures to verify a customer's identity when receiving a "Notice of Address Discrepancy" from a consumer reporting agency; the FTC Affiliate Marketing Rule, which generally requires a business to offer customers the opportunity to opt out of receiving solicitations from the business's affiliates before affiliates may market to the customers; and the Risk-Based Pricing Rule, which generally requires initial creditors to issue either risk-based pricing notices to consumers to whom credit is granted but on relatively unfavorable terms, or credit score disclosure exception notices to all consumer credit applicants. Additional requirements apply to businesses that furnish negative information about consumers to consumer reporting agencies.

- FTC Credit Practices Rule: Dealers are required to provide a written disclosure statement to a cosigner before the cosigner signs an installment sale contract. Dealers cannot "pyramid" late charges (that is, add a late charge onto a payment made in full and on time when the only delinquency was a late charge on a previous installment).

- FTC Holder-in-Due-Course Rule: Preserves the consumer's right to raise claims and defenses against purchasers of consumer credit contracts (with automobile sales, it protects consumers who buy cars from dealerships on credit). When dealerships sell credit contracts to lenders, consumers are obligated to pay the lenders instead of the dealerships. Under the rule, if a dealership engaged in fraud or made misrepresentations in selling a car on credit, a consumer could raise the dealership's conduct as a defense against the lender's demand for payments. Dealerships must ensure that their credit contracts contain the precise disclosure required by the rule.

- Gramm-Leach-Bliley Act: See "FTC Privacy Rule" and "FTC Safeguards Rule" under "All Departments (Customer)."

- Producer-Owned Reinsurance Companies (PORCs): IRS Notice 2004-65 removed certain reinsurance arrangements as "listed transactions," but states that the IRS will continue to scrutinize transactions that shift income from taxpayers to related companies "purported to be insurance companies that are subject to little or no U.S. federal income tax."

- Truth in Lending and Consumer Leasing Acts: Regulations Z and M cover consumer credit and consumer leasing transactions, respectively, specifying information to be disclosed to a consumer before completing the transaction, and information to be disclosed when advertising consumer credit transactions or leases. For example, dealers who advertise a lease down payment or monthly payment amount must disclose in lease ads that the advertised deal is a lease; the total amount due at lease signing; number, amount and period (for example, monthly) of payments; and whether a security deposit is required.

Service and Parts Department

- Clean Air Act: Dealerships may not tamper with, replace or remove emissions-control equipment, such as catalytic converters. CFC recycling regs require dealership air-conditioning techs to obtain certification and to use certified recycling and recovery equipment to capture spent refrigerant, including HFC-134a and other non-ozone-depleting refrigerants. The act also regulates any fuels dealers store and dispense, as well as the alternative fuels motorists use, including gasohol. It restricts emissions from solvents and chemicals.

- Clean Water Act: Sets standards for regulation of wastewater and storm water at dealerships and comprehensive rules governing aboveground oil storage tanks.

- Department of Transportation (DOT) hazardous-materials-handling procedures: Require parts employees who load, unload and package hazardous products, such as airbags, batteries and brake fluid, to be trained in safe handling practices.

- FTC Used Parts Guide: Prohibits misrepresentations that a part is new or about the condition, extent of previous use, reconstruction or repair of a part. Previously used parts must be clearly and conspicuously identified as such in advertising and packaging, and, if the part appears new, on the part itself.

- IRS Core Inventory Valuation: Revenue Procedure 2003-20 creates an optional method for valuing core inventories for those using Lower of Cost or Market Valuation Method.

- LIFO/FIFO inventory accounting method: Revenue Procedure 2002-17 provides a safe-harbor method of accounting that authorizes the use of replacement cost to value year-end parts inventory.

- NHTSA tampering rules: Prohibit dealerships from rendering inoperative safety equipment installed on vehicles in compliance with federal law.

- NHTSA tire rules: Dealerships must report sales of defective tires when the tires are sold separately from vehicles, and must properly manage recalled tires.
- OSHA asbestos standards: Dealerships must use certain procedures during brake and clutch inspections and repairs to minimize workplace exposure. Water, aerosol cleaners or brake washers may be used to comply with the standard.
- OSHA Hazard Communication Standard (right-to-know laws): Dealers must inform employees about chemical hazards they may be exposed to in the workplace, keep chemical product information sheets on-site and accessible, and train staffers to properly handle the hazardous materials they work with. Also, EPA's community right-to-know rules require dealers to list annually with state and local authorities tanks holding more than 1,600 gallons.
- OSHA lock-out/tag-out procedures: Explain what service departments must do to ensure machines, including vehicles, are safely disengaged before being serviced.
- OSHA workplace health and safety standards: Extensive regulations cover a multitude of workplace issues and practices, from chemical labeling requirements to the number of toilets required. Example: Dealerships must determine if workplace hazards warrant personal protective equipment and, if so, to train employees on its use. Verbal or online reports must be made within eight hours of any incident involving the hospitalization or death of any worker.
- Resource Conservation and Recovery Act (RCRA): Comprehensive environmental law regulating many dealership functions, including underground storage tanks and the storage, management and disposal of used oil, antifreeze, mercury products and hazardous wastes. Underground tanks must be monitored, tested and insured against leaks; leaks and spills must be reported to federal and local authorities and cleaned up. The law also regulates new-tank installations. Dealers must obtain EPA ID numbers if they generate more than 220 lb. per month (about half of a 55-gallon drum) of certain substances and must use EPA-certified haulers to remove the waste from the site; dealers must keep records of the shipments. Used oil should be burned in space heaters or hauled off-site for recycling. Used oil filters must be punctured and drained for 24 hours before disposal.
- Safe Drinking Water Act: To protect underground drinking water from contamination, dealerships may be barred from discharging waste liquids (such as used oil, antifreeze and brake fluid) into septic system drain fields, dry wells, cesspools or pits.
- Superfund (Comprehensive Environmental Response, Compensation and Liability Act [CERCLA]): As waste generators, dealerships may be subject to Superfund liability. Carefully select companies to haul waste off-site. Dealers can deduct the cost of cleaning up contaminated soil and water in the year it's done. Dealers may qualify for an exemption from liability at sites involving used oil managed after 1993. The service station dealer exemption application (SSDE) requires dealers to properly manage their oil and to accept oil from do-it-yourselfers.
- UNICAP: See "New- and Used-Vehicle Sales Departments."

Body Shop

- Clean Air Act: National paint and hazardous air-pollution rules require reformulated, environmentally safer paints and finishes, special handling procedures, and record keeping.
- EPA hazardous-waste rules: See "RCRA" under "Service and Parts Department."
- OSHA Hazard Communication Standard (right-to-know laws): See "Service and Parts Department."
- OSHA Respiratory Protection Standard: Requires written programs describing how to select, fit and maintain respirators to protect body shop workers from hazardous chemicals.
- OSHA workplace health and safety standards: Extensive regulations affect body shops in many ways, including mandating the use and care of protective equipment such as face masks, gloves and respirators. The hex chrome standard limits air emissions during sanding and painting. (See also "Service and Parts Department.")
- UNICAP: See "New- and Used-Vehicle Sales Departments."
- VIN and parts marking: Dealers may not alter, destroy or tamper with vehicle identification numbers or antitheft parts-marking ID numbers and should use only properly marked replacement parts.

Doug Greenhaus, Paul Metrey, Brad Miller and Lauren Bailey of the NADA Legal and Regulatory Affairs Department contributed to this guide.

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January 2017

May 15, 2017

By regulations.gov

Samantha K. Dravis
Regulatory Reform Officer and Associate Administrator
Office of Policy
United States Environmental Protection Agency (EPA)
1200 Pennsylvania Ave., N.W.
Washington, DC 20460-0001

RE: Evaluation of Existing Regulations; 40 CFR Chapters I, IV-VII, EPA–HQ–OA–2017–0190

Dear Associate Administrator Dravis:

The National Automobile Dealers Association (NADA) represents more than 16,000 franchised automobile and commercial truck dealers who sell new and used motor vehicles and engage in service, repair and parts sales. Together they employ more than1,100,000 people nationwide, yet the majority are small businesses as defined by the Small Business Administration.

On February 24, 2017, President Trump signed Executive Order (E.O.) 13777, entitled *Enforcing the Regulatory Reform Agenda,* which directs agencies, including EPA, to evaluate existing regulations with an eye toward alleviating unnecessary regulatory burdens. Last month, EPA acted pursuant to Section 3(e) of E.O. 13777 to solicit suggestions for rules that can be repealed, replaced or modified to reduce such burdens. 82 Fed. Reg. 17793 (April 13, 2017). As illustrated by the attached study entitled *The Impact of Federal Regulations on Franchised Automobile Dealerships* and the attached publication entitled *The Regulatory Maze: NADA's Annual Update on Federal Regulations,* franchised automobile and truck dealers are highly regulated small businesses. Set out below is but one of many examples of how EPA can reduce regulatory onerous burdens without reducing environmental protections.

E.O. 13777 takes aim at regulations that are "are outdated, unnecessary, or ineffective". One such rule, entitled *Servicing of Motor Vehicle Air Conditioners*, is found at 40 CFR part 82, subpart B. Originally promulgated in 1992 pursuant to Section 609 of the Clean Air Act (CAA), this rule governs the recycling of refrigerants from motor vehicle air conditioners (MVACs). 42 USC §7671(h). In 1992, EPA appeared to interpret Section 609 of the CAA to require the recycling of ozone depleting refrigerants used in MVACs during services where they may be released into the atmosphere. It is no mystery that the very purpose of Title VI of the CAA,

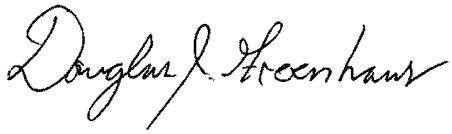
entitled *Stratospheric Ozone Protection,* is to protect the stratospheric ozone layer from ozone depleting chemicals.

In 1992, the refrigerant of choice was CFC-12 (i.e., *Freon*), a chemical well known for its ozone depleting potential. Consequently, its use in MVACs made it subject to the Section 609 rule which, among other things, requires dealership service departments and body shops to purchase recycling equipment and to have their air-conditioning technicians certified. Specific examples of compliance burdens for small business dealerships include $5,000-7,000/unit for recycling equipment and MVAC technician training and certification costs.

Since 1992, MVAC refrigerants containing ozone depleting substances have been phased out. https://www.epa.gov/mvac/refrigerant-transition-environmental-impacts. Yet, dealerships and their technicians performing MVAC service must *still comply with the Section 609 rule with respect to new MVAC refrigerants.* MVACs in the new vehicles of today and tomorrow will use refrigerants with no ozone depleting potential and *de minimis* global warming potential. They pose virtually no potential for environmental harm. Thus, *EPA should clarify that refrigerants free of ozone depleting chemicals should not be subject to the expensive and burdensome MVAC servicing procedures and standards designed for "old" ozone depleting refrigerants.*

On behalf of NADA, I thank EPA for the opportunity to file comments on this matter.

Respectfully submitted,



Douglas I. Greenhaus
Chief Regulatory Counsel,
Environment, Health, and Safety

To: Mccabe, Catherine[McCabe.Catherine@epa.gov]; Coleman, Sam[Coleman.Sam@epa.gov]; Dunham, Sarah[Dunham.Sarah@epa.gov]; Page, Steve[Page.Steve@epa.gov]; Etchells, Elizabeth[Etchells.Elizabeth@epa.gov]
Cc: A-AND-R-DOCKET[A-AND-R-DOCKET@epa.gov]; Kelly, Dan (dan.kelly@vistraenergy.com)[dan.kelly@vistraenergy.com]; Gidiere, Stephen[SGidiere@balch.com]
From: Gidiere, Stephen
Sent: Mon 2/13/2017 10:21:07 PM
Subject: Petition for Reconsideration and Stay, EPA-HQ-OAR-2014-0464, 81 Fed. Reg. 89,870 (Dec. 13, 2016)
Vistra Energy Corp Petition for Reconsideration, 81 FR 89870 (Dec 13, 2016) EPA-HQ-OAR-2014-0464.pdf

Dear Ms. McCabe, Mr. Coleman, Ms. Dunham, Mr. Page, and Ms. Etchells:

Please find attached a petition for reconsideration and stay of the above-referenced final rule, that I am submitting on behalf of my clients Vistra Energy Corp. and its subsidiaries Luminant Generation Company LLC, Big Brown Power Company LLC, Sandow Power Company LLC, and Luminant Mining Company LLC.

Please include this petition in the docket for the above-captioned rulemaking.

Thank you,

Stephen Gidiere

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& BINGHAM LLP

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VISTRA ENERGY

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February 13, 2017

Sent via Certified U.S. Mail Return Receipt Requested and Email (mccabe.catherine@epa.gov)

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1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

RE: Petition for Reconsideration and Administrative Stay—Air Quality Designations for the 2010 Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard for Four Areas in Texas: Freestone and Anderson Counties, Milam County, Rusk and Panola Counties, and Titus County, 81 Fed. Reg. 89,870 (Dec. 13, 2016) (Docket No. EPA-HQ-OAR-2014-0464)

Dear Acting Administrator McCabe:

Vistra Energy Corp. and its subsidiaries Luminant Generation Company LLC, Big Brown Power Company LLC, Sandow Power Company LLC, and Luminant Mining Company LLC (collectively, "Luminant") respectfully petition the U.S. Environmental Protection Agency ("EPA") to reconsider and immediately stay the effective date of EPA's final action entitled *Air Quality Designations for the 2010 Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard—Supplement to Round 2 for Four Areas in Texas: Freestone and Anderson Counties, Milam County, Rusk and Panola Counties, and Titus County* ("Final Rule"), published at 81 Fed. Reg. 89,870 (Dec. 13, 2016).

Luminant has a substantial and unique interest in the Final Rule. Luminant is the largest competitive power generator in Texas. Luminant's generation portfolio includes approximately 17,000 megawatts ("MW") of installed generation capacity, which includes over 8,000 MW from coal and over 6,000 MW from natural gas. As of September 30, 2016, Luminant provided electricity to approximately 24% of residential customers and 19% of commercial customers in the region managed by the Electric Reliability Council of Texas ("ERCOT"),[1] the independent system operator for the majority of the State.

[1] Form S-1, Vistra Energy Corp. at 5 (Dec. 23, 2016).

The Final Rule rejects the State of Texas's recommended designations for three areas in Texas for the 2010 1-hour SO_2 national ambient air quality standard ("NAAQS").[2] Specifically, EPA's Final Rule designates three areas in Texas as nonattainment (Freestone and Anderson Counties; Rusk and Panola Counties; and Titus county) and one area as unclassifiable. 81 Fed. Reg. at 89,870. The three areas designated by EPA as nonattainment surround Luminant's Big Brown Power Plant, Martin Lake Power Plant, and Monticello Power Plant, respectively. EPA's designations are contrary to the attainment/unclassifiable designations recommended by the Texas Commission on Environmental Quality's ("TCEQ"). Luminant submitted to EPA extensive comments and documentation on the proposed rule in support of TCEQ's recommended designations. Nevertheless, EPA rejected TCEQ's recommendations and simply adopted suggested designations by the Sierra Club based solely on modeling simulations submitted by the Sierra Club.

Luminant and the State of Texas believe that EPA's designations were incorrect and contrary to the Clean Air Act ("CAA"), and they have both filed petitions for judicial review of the Final Rule. *See State of Texas et al. v. EPA et al.*, No. 17-60088 (5th Cir.). A copy of Luminant's petition for review that was filed in the U.S. Court of Appeals for the Fifth Circuit on February 10, 2017, is attached as Exhibit A to this petition.

I. EPA should reconsider the Final Rule

Luminant requests that EPA reconsider the Final Rule pursuant to the Administrative Procedure Act ("APA"), 5 U.S.C. § 553(e), or, in the alternative, under the Clean Air Act, 42 U.S.C. § 7607(d)(7)(B). Under the APA, "[e]ach agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule." 5 U.S.C. § 553(e). And under the CAA, EPA must grant reconsideration of a final rule if it can be demonstrated that: (1) "it was impracticable to raise [an] objection within" the time allowed for public comment or "if the grounds for such objection arose after the period for public comment (but within the time specified for judicial review)"; and (2) the "objection is of central relevance[.]" 42 U.S.C. § 7607(d)(7)(B).

a. EPA should reconsider the Final Rule based on TCEQ's monitoring and recent emission declines

EPA should reconsider the Final Rule based on monitoring data to be collected by TCEQ in the areas at issue and recent declines in SO_2 emissions. Doing so would be consistent with the Clean Air Act and EPA past practice. As EPA has previously noted, the use of monitoring data is necessary when making NAAQS designations.[3] In the designation process, the CAA establishes a cooperative federalism approach, and states are granted significant authority. *See id.* § 7407. Specifically, states are to make recommendations to EPA as to which geographic areas

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[2] EPA, *Technical Support Document for the Designation Recommendations for the 2010 Sulfur Dioxide National Ambient Air Quality Standards (NAAQS)—Supplement for Four Areas in Texas Not Addressed in June 30, 2016, Version*, Dock. ID EPA-HQ-OAR-2014-0464-0434 at 3 (Nov. 29, 2016) ("Texas Supp. TSD").

[3] 75 Fed. Reg. 35,520, 35,571 (June 22, 2010); EPA, *Next Steps for Area Designations and Implementation of the Sulfur Dioxide National Ambient Air Quality Standard* 2 (Feb. 6, 2013), *available at* http://faculty.geography.wisc.edu/robertson/docs/439Documents/EPA%20SO2%20monitoring%20statement.pdf ("[T]he starting point for future SO_2 designations should be, as with other NAAQS, a monitoring network to adequately characterize air quality in areas of concern.").

meet or fail to meet the NAAQS or cannot be classified based on available information. *Id.* § 7407(d)(1)(A). The CAA "gives EPA the power to modify a state's designation only to the extent 'necessary,' thereby establishing a deferential standard for EPA disposition of a state choice." 52 Fed. Reg. 49,408, 49,410 (Dec. 31, 1987). In accordance with its authority, TCEQ emphasized in its recommendations to EPA that monitoring data is necessary to characterize accurately actual air quality data for attainment and nonattainment designations for these Texas areas.[4] Consistent with its recommendation, TCEQ has already made efforts to move forward with siting SO_2 monitors in the areas relevant to the Final Rule and has submitted Monitor Placement Evaluation Reports to EPA.[5] We understand that TCEQ submitted these reports to EPA in October and November of 2016, after the close of the public comment period, but before the Final Rule was signed. To our knowledge, EPA has failed to approve them. Despite EPA's failure in this regard, it is apparent that TCEQ is committed to obtaining the necessary data to support credible and defensible designations for these areas.

Importantly, there is every reason to believe that the proposed new monitors to be sited near Luminant's plants—which EPA has refused thus far to approve—will show compliance with the 1-hour SO_2 NAAQS. Indeed, it is undisputable that SO_2 emissions from Luminant's units are declining, both in terms of annual tons and daily maximum tons. Sierra Club's modeling, which EPA accepted as the basis for its designations of nonattainment, used "emissions for the 3-year periods 2012-2014 or 2013-15," according to EPA.[6] But those data sets do not reflect recent significant reductions in SO_2 emissions at Luminant's units. For example, for Luminant's Big Brown Plant, both data sets that EPA says were used in Sierra Club's modeling included 2013, the highest in recent years, in which SO_2 emissions were 62,494 tons.[7] However, Big Brown's SO_2 emissions have declined substantially since 2013. In 2015, Big Brown's SO_2 emissions were only 49,838 and in 2016 only 42,470, as reported in EPA's Clean Air Markets Database ("CAMD").[8] Similarly, at Luminant's Martin Lake Plant, Sierra Club's modeling included the highest year (2013), in which SO_2 emissions were 62,735 tons.[9] However, like Big Brown, Martin Lake's SO_2 emissions have declined substantially. In 2015, Martin Lake's SO_2 emissions were only

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[4] *See* Luminant's Comments on EPA Responses to Certain State Designation Recommendations for the 2010 Sulfur Dioxide National Ambient Air Quality Standard: Notice of Availability and Public Comment Period, Dock. ID EPA-HQ-OAR-2014-0464-0328 at 18-19 (Mar. 31, 2016); Letter from Greg Abbott, Governor of Texas, to Janet G. McCabe, Assistant Administrator, Office of Air and Radiation, EPA (Sept. 18, 2015), *available at* https://www.tceq.texas.gov/assets/public/implementation/air/sip/so2/2015RevisedRecommendation/SO2_Designation_Recommendations_9-18-15.pdf; *see also* Letter from Bryan W. Shaw, Chairman, TCEQ, to Janet G. McCabe, Assistant Administrator, Office of Air and Radiation, EPA and Ron Curry, Regional Administrator, EPA Region 6 (Apr. 19, 2016), *available at* https://www.tceq.texas.gov/assets/public/implementation/air/sip/so2/2015RevisedRecommendation/041916_SO2_Designation_120-Day_Response.pdf.

[5] *See* Big Brown Steam Electric Monitor Placement Evaluation (Exhibit B); Martin Lake Electrical Monitor Placement Evaluation (Exhibit C); Monticello Monitor Placement Evaluation (Exhibit D).

[6] 81 Fed. Reg. at 89,871.

[7] *See* EPA, *Technical Support Document, Texas, Area Designations for the 2010 SO_2 Primary National Ambient Air Quality Standard*, Dock. ID EPA-HQ-OAR-2014-0464-0144 at 192 ("Texas TSD"); Texas Supp. TSD at 18.

[8] *See* EPA, *Air Markets Program Data*, https://ampd.epa.gov/ampd/ (last visited Feb. 13, 2017).

[9] Texas TSD at 156; Texas Supp. TSD at 62.

22,928 tons and in 2016 only 25,471 tons, as reported in CAMD.[10] Maximum daily emissions at Luminant's plants have also declined substantially in more recent years, as reflected in CAMD.

Not only did EPA's Final Rule rely on data that does not reflect recent emission declines, EPA relied heavily on modeling that was not subject to public comment. In the Final Rule, EPA relied heavily on "Sierra Club's 2016 modeling,"[11] but that modeling was submitted on the last day of the public comment period (March 31, 2016), and "Sierra Club's 2016 modeling" for Texas areas was not even posted by EPA to the electronic docket.[12] Thus, neither Luminant nor the State of Texas had the opportunity to comment on that modeling, which was the primary basis for EPA's Final Rule.

In light of the more recent data, EPA should grant reconsideration of the Final Rule and approve TCEQ's proposed plans for installation of monitors in the relevant areas. This will allow TCEQ the opportunity to provide additional data that is a more reliable and accurate representation of the air quality in the relevant areas. Such an approach will be consistent with EPA's previously stated preference for monitoring data, rather than modeling predictions, in making NAAQS designations. Such an approach will also be consistent with the goals of the CAA, which "gives great deference to governors' recommendations for areas within their states . . . ." *Pennsylvania Dep't of Envtl. Prot. v. EPA*, 429 F.3d 1125, 1129 (D.C. Cir. 2005).

b. EPA should reconsider the Final Rule based on EPA's failure to provide public notice and opportunity for comment on EPA's findings related to venue

EPA should also reconsider the Final Rule because there was no opportunity for the public to comment on EPA's conclusions as to proper venue for judicial review. For the first time in the Final Rule, EPA found its action, which addressed only four areas in Texas, to be "nationally applicable" and further found its action was "based on a determination of nationwide scope and effect." 81 Fed. Reg. at 89,875. Not only did Luminant not have an opportunity to comment on these conclusions (because they were not introduced in the proposed rule), but EPA's approach in the Final Rule is in direct conflict with binding Fifth Circuit precedent. The Fifth Circuit, which is the proper venue for judicial review of the Final Rule, has held:

> Section 7607(b)(1) divides challenges into three general categories. Petitions for review of nationally applicable actions may only be filed in the D.C. Circuit. Petitions for review of locally or regionally applicable actions may only be filed in the regional circuit courts of appeal. Petitions for review of locally or regionally applicable actions based on a determination that has nationwide scope or effect may only be filed in the D.C. Circuit.

Texas v. EPA, 829 F.3d 405, 418 (5th Cir. 2016) (citing *Texas v. EPA*, No. 10-60961, 2011 WL 710598, at *3 (5th Cir. Feb. 24, 2011)). Therefore, a rule cannot be both "nationally applicable" and "based on a determination of

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[10] *See* EPA, *Air Markets Program Data*, https://ampd.epa.gov/ampd/ (last visited Feb. 13, 2017).

[11] Texas Supp. TSD at 62; *see also* 81 Fed. Reg. at 89,873.

[12] Sierra Club's Comments on EPA Responses to Certain State Designation Recommendations for the 2010 Sulfur Dioxide National Ambient Air Quality Standard: Notice of Availability and Public Comment Period, Dock. ID EPA-HQ-OAR-2014-0464-0332 (Mar. 31, 2016) (Appendices A-E and I: Colorado, Maryland, Missouri, Ohio, Indiana and Texas).

nationwide scope or effect," as EPA claims to have found in the Final Rule, because the latter is only possible when a rule is "locally or regionally applicable." Moreover, a locally or regionally applicable rule can only be "based on a determination of nationwide scope or effect," "[1] ***[i]f*** such action ***is based on*** a determination of nationwide scope or effect ***and*** [2] ***if*** in taking such action the Administrator finds and publishes that such action is based on such a determination." 42 U.S.C. § 7607(b)(1) (emphasis added). "[B]oth criteria must be satisfied to transfer venue from the appropriate regional circuit to the D.C. Circuit." *Texas*, 829 F.3d at 420.

Because EPA's Final Rule relates only to areas within the State of Texas, the rule is, on its face, locally or regionally applicable. As a result, the Final Rule by definition is not "nationally applicable." Further, despite EPA's finding, the Final Rule is not, in fact, based on any determination that is of nationwide scope or effect. EPA based its designations "on a number of intensely factual determinations." *See id.* at 421; *see generally* Texas TSD. None of these area-specific determinations has a nationwide scope or effect.

EPA claims that "this action supplements the June 30, 2016 final action taken by the EPA," where EPA concluded its action there was "nationally applicable" and was based on a determination that was of "nationwide scope and effect." 81 Fed. Reg. at 89,875. But that other final action is independent of EPA's Final Rule for Texas, which addresses Texas areas only. Moreover, even if the two separate actions were somehow related, that would not cure EPA's failure to provide notice and opportunity to comment on EPA's venue findings. In that other rulemaking, EPA similarly announced its conclusions for the first time in its final rule and did not provide for an opportunity for the public to comment on them. *Compare* 81 Fed. Reg. 10,563 (Mar. 1, 2016) *with* 81 Fed. Reg. 45,039 (July 12, 2016).

Because EPA did not propose any findings about venue in the proposed rule here, it was impracticable to raise an objection within the time allowed for public comment. Accordingly, EPA should grant Luminant's petition for reconsideration so that EPA's findings may be subject to public notice and comment.

II. EPA should grant an administrative stay of the Final Rule's effective date

EPA should also immediately grant an administrative stay of the Final Rule's effective date pursuant to the APA, 5 U.S.C. § 705, or, in the alternative, pursuant to the CAA, 42 U.S.C. § 7607(d)(7)(B). Under the APA, "[w]hen an agency finds that justice so requires, it may postpone the effective date of action taken by it, pending judicial review." 5 U.S.C. § 705. Under the CAA, "[t]he effectiveness of the rule may be stayed during such reconsideration . . . by the Administrator . . . for a period not to exceed three months." 42 U.S.C. § 7607(d)(7)(B).

A stay of the effective date of the Final Rule is appropriate under both standards, but the facts here call for a stay under the APA pending judicial review and the implementation of TCEQ's monitoring plans, whichever is later. A stay is permitted under the APA "[r]egardless of whether [the stay request] meet[s] the requirements of Section 307(d)(7)(b)[.]" 46 Fed. Reg. 8,581, 8,582 n.1 (Jan. 27, 1981). To qualify for a stay under Section 705 of the APA, only two conditions must be satisfied: (1) judicial review must be pending and (2) when "justice so requires" the stay. 5 U.S.C. § 705. A stay issued under the APA is not limited to three months, and EPA has used its authority under the APA to "postpone" the effective date of a rule indefinitely. *See, e.g.*, 75 Fed. Reg. 27,643

(May 18, 2010); 61 Fed. Reg. 28,508 (June 5, 1996); 56 Fed. Reg. 42,874 (Sept. 5, 1991). Here, Luminant does not seek a stay of the effective date indefinitely. Rather, Luminant seeks a stay of the effective date pending judicial review and until TCEQ is able to implement its monitoring plans to collect sufficient monitoring data to accurately characterize the air quality in the Texas areas at issue, whichever is later.

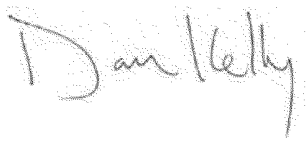
The conditions for stay of the Final Rule's effective date under the APA are met here. Petitions for judicial review have been filed by the State of Texas and Luminant. *See State of Texas et al. v. EPA et al.*, No. 17-60088 (5th Cir.). Further, justice requires a stay. The impact of a nonattainment designation, as EPA has made here, is significant. A nonattainment designation triggers a requirement for the state to develop a nonattainment state implementation plan ("SIP"). 42 U.S.C. § 7502(b). Absent a stay of the effective date, Texas would have to commit significant resources to developing a nonattainment SIP. Additionally, because of such designation, sources in the areas at issue may be required to adopt additional emission controls and permit limits. This would stifle economic development and growth in these areas. Given the recent declines in SO_2 emissions in these areas, it would be particularly inequitable to force TCEQ to needlessly expend resources to develop and implement a SIP revision that is not necessary. It is imperative that TCEQ have the ability to collect real world data to support proper designations prior to requiring sources to commit significant resources for controls and adopt burdensome restrictions in their permits.

A stay is particularly necessary here, where EPA has broken from its standard practice of setting the effective date of a rule for 60 days after publication, as it did in its previous SO_2 designations. 81 Fed. Reg. at 45,039. Here, EPA set the effective date of the Final Rule for 30 days after publication, making the effective date January 12, 2017, rather than February 13, 2017. Importantly, on January 20, 2017, the Assistant to the President and Chief of Staff issued a memorandum to the heads of all agencies directing that for "regulations that have been published in the [Federal Register] but have not taken effect, as permitted by applicable law, [agencies should] temporarily postpone their effective date for 60 days from the date of th[e] memorandum . . . for the purpose of reviewing questions of fact, law, and policy they raise." Reince Priebus, Memorandum for the Heads and Acting Heads of Executive Departments and Agencies, 82 Fed. Reg. 8,346 (Jan. 24, 2016). The Final Rule is not directly subject to the Priebus Memo, but the same principles apply here and call for a stay of the Final Rule's effective date. Here, there are substantial "questions of fact, law, and policy" that warrant a stay of the effective date and a review by the President's appointees. Such questions of fact, law, and policy include whether EPA properly relied on Sierra Club's modeling rather than promptly moving forward with TCEQ's monitoring plan in an effort to obtain monitoring data. In light of the new administration's desire to review rules that involve substantial questions, in addition to the significant burdens that will result from the flawed designations, "justice . . . requires" a stay of the Final Rule.

For all these reasons, pursuant to the APA and the CAA, EPA should grant Luminant's petition for reconsideration and immediately issue an administrative stay of the Final Rule's effective date. Thank you for your consideration of our request, and please contact me if I can provide any further information.

EPA-HQ-2018-001738: Production Set #1

Sincerely,



Daniel Jude Kelly
VP & Associate General Counsel

cc: Samuel J. Coleman, Acting Administrator, EPA Region 6 (via email at coleman.sam@epa.gov)
Sarah Dunham, Acting Assistant Administrator, Office of Air and Radiation (via email at dunham.sarah@epa.gov)
Steve Page, Director, Office of Air Quality Planning and Standards (via email at page.steve@epa.gov)
Liz Etchells, Office of Air Quality Planning and Standards (via email at etchells.elizabeth.epa.gov)

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Exhibit A

IN THE UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

LUMINANT GENERATION COMPANY LLC, BIG BROWN POWER COMPANY LLC, SANDOW POWER COMPANY LLC, and LUMINANT MINING COMPANY LLC	)	
Petitioners,	)	
	)	**Case No. _____**
v.	)	
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY and CATHERINE McCABE, Acting Administrator, United States Environmental Protection Agency	)	
Respondents.	)	

PETITION FOR REVIEW

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Counsel for Petitioners Luminant Generation Company LLC, Big Brown Power Company LLC, Sandow Power Company LLC, and Luminant Mining Company LLC

CERTIFICATE OF INTERESTED PERSONS

The undersigned counsel of record certifies that the following listed persons and entities as described in the fourth sentence of Fifth Circuit Rule 28.2.1 have an interest in the outcome of this case. These representations are made in order that the judges of this court may evaluate possible disqualification or recusal.

- Balch & Bingham LLP (Counsel for Petitioners)
- Big Brown Power Company LLC (Petitioner)
- Coleman, Sam (Acting Regional Administrator for Respondent United States Environmental Protection Agency)
- Gidiere, P. Stephen III (Counsel for Petitioners)
- Kelly, Daniel J. (Counsel for Petitioners and Vice President & Associate General Counsel for Vistra Energy Corp.)
- Luminant Generation Company LLC (Petitioner)
- Luminant Mining Company LLC (Petitioner)
- McCabe, Catherine, Acting Administrator, United States Environmental Protection Agency (Respondent)
- Minoli, Kevin (Acting General Counsel for Respondent United States Environmental Protection Agency)
- Moore, C. Grady III (Counsel for Petitioners)
- Moore, Stephanie Zapata (Counsel for Petitioners and Vice President & Associate General Counsel for Vistra Energy Corp.)
- Sandow Power Company LLC (Petitioner)
- Sessions, Jeff, Attorney General, U.S. Department of Justice (Counsel for Respondents)

- United States Environmental Protection Agency (Respondent)
- Vistra Asset Company LLC (Parent company of Petitioners)
- Vistra Energy Corp. (Parent company of Petitioners)
- Vistra Intermediate Company LLC (Parent company of Petitioners)
- Vistra Operations Company LLC (Parent company of Petitioners)
- Wood, Jeffrey, Acting Assistant Attorney General, Environment and Natural Resources Division, U.S. Department of Justice (Counsel for Respondents)

Respectfully submitted,

s/ P. Stephen Gidiere III
Counsel for Petitioners

IN THE UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

LUMINANT GENERATION COMPANY LLC, BIG BROWN POWER COMPANY LLC, SANDOW POWER COMPANY LLC, and LUMINANT MINING COMPANY LLC	)	
Petitioners,	)	
	)	**Case No. _____**
v.	)	
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY and CATHERINE McCABE, Acting Administrator, United States Environmental Protection Agency	)	
Respondents.	)	

PETITION FOR REVIEW

Pursuant to Federal Rule of Appellate Procedure 15 and Section 307(b) of the Clean Air Act, 42 U.S.C. § 7607(b), Luminant Generation Company LLC, Big Brown Power Company LLC, Sandow Power Company LLC, and Luminant Mining Company LLC (collectively, "Luminant Petitioners") file this petition for review of the U.S. Environmental Protection Agency's ("EPA") final rule entitled *Air Quality Designations for the 2010 Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard—Supplement to Round 2 for Four Areas in Texas: Freestone and Anderson Counties,*

Milam County, Rusk and Panola Counties, and Titus County and issued on December 13, 2016 ("Final Rule").[1] *See* 81 Fed. Reg. 89,870 (Dec. 13, 2016).

Jurisdiction and venue for this petition are proper in this Court under 42 U.S.C. § 7607(b). The Final Rule applies to areas only in the State of Texas and in no other state and is based on determinations specific to those areas. The Final Rule is thus a locally or regionally applicable final action of the EPA Administrator and is not "nationally applicable," nor is it based on a determination of "nationwide scope or effect." 42 U.S.C. § 7607(b). This petition for review is timely filed within 60 days of the date of publication in the Federal Register. *Id.*

Dated: February 10, 2017

Respectfully submitted,

s/ P. Stephen Gidiere III
Counsel for Petitioners

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[1] Pursuant to Fifth Circuit Rule 15.1, a copy of the Final Rule is attached to this petition.

CERTIFICATE OF SERVICE

Pursuant to Federal Rule of Appellate Procedure 15(c), I hereby certify that I have this day caused the foregoing documents to be served by first-class mail, postage prepaid, on February 10, 2017, upon the following:

Jeff Sessions
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Dated: February 10, 2017

s/ P. Stephen Gidiere III
Counsel for Petitioners

appropriate, disproportionate human health or environmental effects, using practicable and legally permissible methods, under Executive Order 12898 (59 FR 7629, February 16, 1994).

B. Submission to Congress and the Comptroller General

The Congressional Review Act, 5 U.S.C. 801 *et seq.,* as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this action and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a ''major rule'' as defined by 5 U.S.C. 804(2).

In addition, this rulemaking determining that the Delaware County Area has attained the 2012 annual $PM_{2.5}$ NAAQS does not have tribal implications as specified by Executive Order 13175 (65 FR 67249, November 9, 2000), because the SIP is not approved to apply in Indian country located in the state, and EPA notes that it will not impose substantial direct costs on tribal governments or preempt tribal law.

C. Petitions for Judicial Review

Under section 307(b)(1) of the CAA, petitions for judicial review of this action must be filed in the United States Court of Appeals for the appropriate circuit by February 13, 2017. Filing a petition for reconsideration by the Administrator of this final rule does not affect the finality of this action for the purposes of judicial review nor does it extend the time within which a petition for judicial review may be filed, and shall not postpone the effectiveness of such rule or action. Parties with objections to this direct final rule are encouraged to file a comment in response to the parallel notice of proposed rulemaking for this action published in the proposed rules section of this **Federal Register**, rather than file an immediate petition for judicial review of this direct final rule, so that EPA can withdraw this direct final rule and address the comment in the proposed rulemaking action.

This determination of attainment of the 2012 annual $PM_{2.5}$ NAAQS for the Delaware County nonattainment area may not be challenged later in proceedings to enforce its requirements. (See section 307(b)(2)).

List of Subjects in 40 CFR Part 52

Environmental protection, Air pollution control, Incorporation by reference, Intergovernmental relations, Particulate matter, Reporting and recordkeeping requirements.

Dated: November 22, 2016.

Shawn M. Garvin,

Regional Administrator, Region III.

40 CFR part 52 is amended as follows:

PART 52—APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS

* 1. The authority citation for part 52 continues to read as follows:

Authority: 42 U.S.C. 7401 *et seq.*

Subpart NN—Pennsylvania

* 2. In §52.2059, add paragraph (u) to read as follows:

§52.2059 Control strategy: Particulate matter.

* * * * *

(u) *Determination of attainment.* EPA has determined based on 2013 to 2015 ambient air quality monitoring data, that the Delaware County, Pennsylvania moderate nonattainment area has attained the 2012 annual fine particulate matter ($PM_{2.5}$) primary national ambient air quality standard (NAAQS). This determination, in accordance with 40 CFR 51.1015, suspends the requirements for this area to submit an attainment demonstration, associated reasonably available control measures, a reasonable further progress plan, contingency measures, and other planning state implementation plan revisions related to attainment of the standard for as long as this area continues to meet the 2012 annual $PM_{2.5}$ NAAQS.

[FR Doc. 2016–29751 Filed 12–12–16; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 81

[EPA–HQ–OAR–2014–0464; FRL–9956–10–OAR]

Air Quality Designations for the 2010 Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard—Supplement to Round 2 for Four Areas in Texas: Freestone and Anderson Counties, Milam County, Rusk and Panola Counties, and Titus County

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This rule establishes the initial air quality designations for four areas in Texas for the 2010 primary sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS). The Environmental Protection Agency (EPA) is designating three of the areas as nonattainment because they do not meet the NAAQS. One area is being designated unclassifiable because it cannot be classified on the basis of available information as meeting or not meeting the NAAQS. The designations are based on the weight of evidence for each area, including available air quality monitoring data and air quality modeling. For the areas designated nonattainment by this rule, the Clean Air Act (CAA) directs the state of Texas to undertake certain planning and pollution control activities to attain the SO_2 NAAQS as expeditiously as practicable. This action is a supplement to the final rule addressing the second round of area designations for the 2010 SO_2 NAAQS, which the EPA Administrator signed on June 30, 2016.

DATES: The effective date of this rule is January 12, 2017.

ADDRESSES: The EPA has established a docket for the second round of designations, including this supplemental action, under Docket ID No. EPA–HQ–OAR–2014–0464. All documents in the docket are listed in the *http://www.regulations.gov* Web site. Although listed in the index, some information is not publicly available, *e.g.,* Confidential Business Information or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available electronically in *http://www.regulations.gov.*

In addition, the EPA has established a Web site for the 2010 SO_2 NAAQS designations rulemakings at: *https://*

www.epa.gov/sulfur-dioxide-designations. The Web site includes the EPA's final SO_2 designations, as well as state and tribal initial recommendation letters, the EPA's letters announcing modifications to those recommendations, technical support documents, responses to comments and other related technical information.

FOR FURTHER INFORMATION CONTACT: For general questions concerning this supplemental action, please contact Liz Etchells, U.S. EPA, Office of Air Quality Planning and Standards, Air Quality Planning Division, C539–04, Research Triangle Park, NC 27711, telephone (919) 541–0253, email at *etchells.elizabeth@epa.gov.*

SUPPLEMENTARY INFORMATION:

U.S. EPA Regional Office Contacts: Region VI—Jim Grady, telephone (214) 665–6745, email at *grady.james@epa.gov.*

The public may inspect the rule and area-specific technical support information at the following location: Air Planning Section, EPA Region VI, 1445 Ross Avenue, Dallas, TX 75202.

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I. Preamble Glossary of Terms and Acronyms

The following are abbreviations of terms used in the preamble.

APA Administrative Procedure Act
CAA Clean Air Act
CFR Code of Federal Regulations
DC District of Columbia
EO Executive Order
EPA Environmental Protection Agency
FR Federal Register
NAAQS National Ambient Air Quality Standards
NTTAA National Technology Transfer and Advancement Act
OMB Office of Management and Budget
SO_2 Sulfur Dioxide
SO_X Sulfur Oxides
RFA Regulatory Flexibility Act
UMRA Unfunded Mandate Reform Act of 1995
TAR Tribal Authority Rule
TAD Technical Assistance Document
TSD Technical Support Document
US United States

II. What is the purpose of this supplemental action?

The purpose of this final action is to announce and promulgate initial air quality designations for four areas in Texas for the 2010 primary SO_2 NAAQS, in accordance with the requirements of the CAA. The EPA is designating three of these areas as nonattainment, and one area as unclassifiable. As discussed in Section IV of this document, the EPA is designating areas for the 2010 SO_2 NAAQS in multiple rounds under a court-ordered schedule pursuant to a consent decree. The EPA completed the first round of SO_2 designations in an action signed by the Administrator on July 25, 2013 (78 FR 47191; August 5, 2013). In that action, the EPA designated 29 areas in 16 states as nonattainment, based on air quality monitoring data.

The court order required the EPA Administrator to sign a notice designating areas in a second round that contained sources meeting certain criteria no later than July 2, 2016. *See Sierra Club and NRDC* v. *McCarthy,* No. 3:13–cv–3953–SI (N.D. Cal.) (March 2, 2015). The four areas in Texas covered by this action met those criteria, and the EPA responded to state recommendations for Round 2 designations, including Texas' recommendations for these four areas, on February 11, 2016 (Letter from Ron Curry, EPA Region 6 Administrator, to Governor of Texas, Honorable Greg Abbott). In the second round of SO_2 designations signed on June 30, 2016, the EPA designated 61 areas in 24 states (including eight other areas in Texas): four nonattainment areas, 41 unclassifiable/attainment areas and 16 unclassifiable areas (81 FR 45039; July 12, 2016). However, by a series of stipulations of the parties in *Sierra Club and NRDC* v. *McCarthy* and orders of the Court, the deadline to promulgate designations was extended to November 29, 2016, for the four areas in Texas that are the subject of this supplemental action. This action to designate four Texas areas further discharges the EPA's duty to issue the second round of SO_2 designations, and uses the same administrative record as supported by the action signed on June 30, 2016, that addressed eight other Texas areas and other areas in the United States, as supplemented by additional materials further addressing these four Texas areas.

In this supplementary designation action, the list of areas being designated in Texas and the boundaries of each area appear in the tables within the regulatory text at the end of this notice. These designations are based on the EPA's technical assessment of and conclusions regarding the weight of evidence for each area, including but not limited to available air quality monitoring data or air quality modeling. With respect to air quality monitoring data, the EPA considered data from the most recent calendar years 2012–2015. In the modeling runs conducted by industry and members of the public, the air quality impacts of the actual emissions for the 3-year periods 2012–2014 or 2013–2015 were assessed.

For the areas being designated nonattainment, the CAA directs states to develop and submit to the EPA State Implementation Plans within 18 months of the effective date of this final rule that meet the requirements of sections 172(c) and 191–192 of the CAA and provide for attainment of the NAAQS as expeditiously as practicable, but not later than 5 years from the effective date of this final rule. We also note that under the EPA's SO_2 Data Requirements Rule in 40 CFR part 51, subpart BB (80 FR 51052; August 21, 2015), the EPA expects to receive additional air quality characterization for the one area in Milam County, Texas, designated unclassifiable in this action, and the agency will consider such data, as appropriate, in future actions.

III. What is the 2010 SO_2 NAAQS and what are the health concerns that it addresses?

The Administrator signed a final rule revising the primary SO_2 NAAQS on June 2, 2010. The rule was published in the **Federal Register** on June 22, 2010 (75 FR 35520) and became effective on August 23, 2010. Based on the Administrator's review of the air quality criteria for oxides of sulfur and the primary NAAQS for oxides of sulfur as measured by SO_2, the EPA revised the primary SO_2 NAAQS to provide requisite protection of public health with an adequate margin of safety. Specifically, the EPA established a new 1-hour SO_2 standard at a level of 75 parts per billion (ppb), which is met at an ambient air quality monitoring site when the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations is less than or equal to 75 ppb, as determined in accordance with Appendix T of 40 CFR part 50. 40 CFR 50.17(a)–(b). The EPA also established provisions to revoke both the existing 24-hour and annual primary SO_2 standards, subject to certain conditions. 40 CFR 50.4(e).

Additional information regarding the current scientific evidence on the health impacts of short-term exposures to SO_2 is provided in the **Federal Register** notice containing the final rule for the second round of SO_2 designations for other areas that was signed on June 30, 2016. *See* 81 FR 45041.

IV. What are the CAA requirements for air quality designations and what action has the EPA taken to meet these requirements?

After the EPA promulgates a new or revised NAAQS, the EPA is required to designate all areas of the country as either "nonattainment," "attainment," or "unclassifiable," for that NAAQS pursuant to section 107(d)(1) of the CAA. Section 107(d)(1)(A)(i) of the CAA defines a nonattainment area as "any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant." If an area meets either prong of this definition, then the EPA is obligated to designate the area as "nonattainment." This provision also defines an attainment area as any area other than a nonattainment area that meets the NAAQS and an unclassifiable area as any area that cannot be classified on the basis of available information as meeting or not meeting the NAAQS.

Additional information regarding the process for designating areas following promulgation of a new or revised NAAQS pursuant to section 107(d) of the CAA and how the EPA is applying this process to the designation of areas under the 2010 SO_2 NAAQS is provided in the final rule addressing the second round of SO_2 designations for other areas signed on June 30, 2016. *See* 81 FR 45041. For this supplemental action, the EPA reiterates that CAA section 107(d) provides the agency with discretion to determine how best to interpret the terms in the definition of a nonattainment area (*e.g.,* "contributes to" and "nearby") for a new or revised NAAQS, given considerations such as the nature of a specific pollutant, the types of sources that may contribute to violations, the form of the standards for the pollutant, and other relevant information. In particular, the EPA's position is that the statute does not require the agency to establish bright line tests or thresholds for what constitutes "contribution" or "nearby" for purposes of designations.[1]

Similarly, the EPA's position is that the statute permits the EPA to evaluate the appropriate application of the term "area" to include geographic areas based upon full or partial county boundaries, as may be appropriate for a particular NAAQS. For example, CAA section 107(d)(1)(B)(ii) explicitly provides that the EPA can make modifications to designation recommendations for an area "or portions thereof," and under CAA section 107(d)(1)(B)(iv) a designation remains in effect for an area "or portion thereof" until the EPA redesignates it.

As explained in more detail in the final rule addressing the second round of SO_2 designations for other areas, the EPA completed the first round of SO_2 designations for 29 areas on July 25, 2013 (78 FR 47191), and intends to complete up to three more rounds of designations to address all remaining areas pursuant to a schedule contained in a consent decree and enforceable order entered by the U.S. District Court for the Northern District of California on March 2, 2015. *See* 81 FR 45042.

The court order specifies that in this second round of SO_2 designations the EPA must designate two groups of areas: (1) Areas that have newly monitored violations of the 2010 SO_2 NAAQS and (2) areas that contain any stationary sources that had not been announced as of March 2, 2015, for retirement and that, according to the EPA's Air Markets Database, emitted in 2012 either (i) more than 16,000 tons of SO_2, or (ii) more than 2,600 tons of SO_2 with an annual average emission rate of at least 0.45 pounds of SO_2 per one million British thermal units (lbs SO_2/mmBTU).

On March 20, 2015, the EPA sent letters to Governors notifying them of the schedule for completing the remaining designations for the 2010 1-hour SO_2 NAAQS. The EPA offered states, including Texas, the opportunity to submit updated recommendations and supporting information for the EPA to consider for the affected areas. The EPA also notified states that the agency had updated its March 24, 2011, SO_2 designations guidance to support analysis of designations and boundaries for the next rounds of designations. All of the states, including Texas, with affected areas submitted updated designation recommendations.

In a letter dated February 11, 2016, the EPA notified Texas of its intended designation of twelve Round 2 areas, including the four areas in Texas addressed in this final notice, as either nonattainment, unclassifiable/attainment, or unclassifiable for the SO_2 NAAQS. Texas then had the opportunity to demonstrate why they believed the EPA's intended modification of their updated recommendations may be inappropriate. Although not required, as the EPA had done for the first round of SO_2 designations, the EPA also provided an opportunity for members of the public to comment on the EPA's February 2016 response letters. The EPA published a notice of availability and public comment period for the intended designation on March 1, 2016 (81 FR 10563). The public comment period closed on March 31, 2016. The updated recommendations, the EPA's February 2016 responses to those letters, any modifications, and the subsequent state and public comment letters, are in the docket for the Round 2 SO_2 designations at Docket ID No. EPA–HQ–OAR–2014–0464 and are available on the SO_2 designations Web site.

Before taking final action, however, the parties to *Sierra Club and NRDC* v. *McCarthy* filed the first in a series of joint stipulations extending the deadline for these four areas in Texas, out to November 29, 2016.[2] In the final rule signed on June 30, 2016, the EPA promulgated designations for the Round 2 areas for which no extensions in the deadline had been obtained (including the eight other Texas areas) and explained the ongoing process for completing SO_2 designations for all

[1] This view was confirmed in *Catawba County* v. *EPA*, 571 F.3d 20 (D.C. Cir. 2009).

[2] The parties to *Sierra Club and NRDC* v. *McCarthy* also filed a joint stipulation extending the Round 2 designation deadline for the Muskogee County Area in Oklahoma out to December 31, 2016.

areas of the country by December 31, 2020 (*see generally* 81 FR 45042–43).

In these supplemental Round 2 designations, and consistent with the extended deadline under the consent decree, the EPA must designate the four areas in Texas associated with the following sources by November 29, 2016: The Big Brown Steam Electric Station in the Freestone and Anderson Counties Area, the Sandow Power Station in the Milam County Area, the Martin Lake Electrical Station in the Rusk and Panola Counties Area, and the Monticello Steam Electric Station in the Titus County Area.

V. What guidance did the EPA issue and how did the EPA apply the statutory requirements and applicable guidance to determine area designations and boundaries?

Following entry of the March 2, 2015, court order, the EPA issued updated designations guidance through a March 20, 2015, memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions 1–10 titled, ''Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard.'' As explained in the final rule addressing the second round of SO_2 designations for other areas signed on June 30, 2016, this guidance contains the factors the EPA intends to evaluate in determining the appropriate designations and associated boundaries for all remaining areas in the country, including: (1) Air quality characterization via ambient monitoring or dispersion modeling results; (2) emissions-related data; (3) meteorology; (4) geography and topography; and (5) jurisdictional boundaries. *See* 81 FR at 45043. Additional information regarding relevant guidance relied upon in designating the other second round areas and that is also used in this supplemental action is available in the previously issued final rule. *See id.*

VI. What air quality information has the EPA used for these designations?

To inform designations for the SO_2 NAAQS, air agencies have the flexibility to characterize air quality using either appropriately sited ambient air quality monitors or using modeling of actual or allowable source emissions. The EPA's non-binding Monitoring Technical Assistance Document (TAD) and Modeling TAD contain scientifically sound recommendations on how air agencies should conduct such monitoring or modeling. For the SO_2 designations of the four Texas areas addressed in this supplemental action, the EPA is using the same approach taken for a number of areas designated in the final rule signed on June 30, 2016, and considering available air quality monitoring data from calendar years 2012–2015, and modeling submitted by the affected emissions sources and a public interest group. *See* 81 FR 45043. In the modeling runs, the impacts of the actual emissions for the 3-year periods 2012–2014 or 2013–2015 were considered. The 1-hour primary SO_2 standard is violated at an ambient air quality monitoring site (or in the case of dispersion modeling, at an ambient air quality receptor location) when the 3-year average of the annual 99th percentile of the daily maximum 1-hour average concentrations exceeds 75 ppb, as determined in accordance with appendix T of 40 CFR part 50. The EPA has concluded that dispersion modeling shows that three Round 2 areas in Texas (portions of Freestone and Anderson Counties, portions of Rusk and Panola Counties, and portions of Titus County) are not meeting the 1-hour primary SO_2 standard and we are, therefore, designating these areas as nonattainment. Based on available information, the EPA has also concluded that it cannot determine whether one Round 2 area in Texas (Milam County) is or is not meeting the 1-hour primary SO_2 standard and whether the area contributes to a violation in a nearby area. Therefore, we are designating this area as unclassifiable. Details about the available information can be found in the supplemental technical support document in the docket for the Round 2 SO_2 designations at Docket ID No. EPA–HQ–OAR–2014–0464.

VII. How do the designations supplementing the Round 2 designations affect Indian country?

For the designations in four areas of Texas for the 2010 primary SO_2 NAAQS supplementing the Round 2 designations, the EPA is designating 3 state areas as nonattainment and 1 state area as unclassifiable. No areas of Indian country are being designated as part of this action.

VIII. Where can I find information forming the basis for this action and exchanges between the EPA, states and tribes related to this action?

Information providing the basis for this action can be found in several technical support documents (TSDs), a response to comments document (RTC) and other information in the docket. The TSDs, RTC, applicable EPA guidance memoranda and copies of correspondence regarding this process between the EPA and the states, tribes and other parties, are available for review at the EPA Docket Center listed above in the **ADDRESSES** section of this document and on the agency's SO_2 Designations Web site at *https://www.epa.gov/sulfur-dioxide-designations.* Area-specific questions can be addressed by the EPA Regional office (*see* contact information provided at the beginning of this notice).

IX. Environmental Justice Concerns

When the EPA establishes a new or revised NAAQS, the CAA requires the EPA to designate all areas of the U.S. as either nonattainment, attainment, or unclassifiable. This final action addresses designation determinations for four areas in Texas for the 2010 primary SO_2 NAAQS. Area designations address environmental justice concerns by ensuring that the public is properly informed about the air quality in an area. In locations where air quality does not meet the NAAQS, the CAA requires relevant state authorities to initiate appropriate air quality management actions to ensure that all those residing, working, attending school, or otherwise present in those areas are protected, regardless of minority and economic status.

X. Statutory and Executive Order Reviews

Upon promulgation of a new or revised NAAQS, the CAA requires the EPA to designate areas as attaining or not attaining the NAAQS. The CAA then specifies requirements for areas based on whether such areas are attaining or not attaining the NAAQS. In this final rule, the EPA assigns designations to selected areas as required.

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is exempted from the Office of Management and Budget because it responds to the CAA requirement to promulgate air quality designations after promulgation of a new or revised NAAQS.

B. Paperwork Reduction Act (PRA)

This action does not impose an information collection burden under the PRA. This action responds to the requirement to promulgate air quality designations after promulgation of a new or revised NAAQS. This requirement is prescribed in the CAA section 107 of title 1. This action does not contain any information collection activities.

C. Regulatory Flexibility Act (RFA)

This final rule is not subject to the RFA. The RFA applies only to rules subject to notice-and-comment rulemaking requirements under the Administrative Procedure Act (APA), 5 U.S.C. 553, or any other statute. This rule is not subject to notice-and-comment requirements under the APA but is subject to the CAA section 107(d)(2)(B) which does not require a notice-and-comment rulemaking to take this action.

D. Unfunded Mandates Reform Act (UMRA)

This action does not contain any unfunded mandates as described by URM, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. The action imposes no enforceable duty on any state, local or tribal governments or the private sector.

E. Executive Order 13132: Federalism

This final action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states or on the distribution of power and responsibilities among the various levels of government.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This action does not have tribal implications, as specified in Executive Order 13175. This action concerns the designation of certain areas in the U.S. for the 2010 primary SO_2 NAAQS. The CAA provides for states and eligible tribes to develop plans to regulate emissions of air pollutants within their areas, as necessary, based on the designations. The Tribal Authority Rule (TAR) provides tribes the opportunity to apply for eligibility to develop and implement CAA programs, such as programs to attain and maintain the SO_2 NAAQS, but it leaves to the discretion of the tribe the decision of whether to apply to develop these programs and which programs, or appropriate elements of a program, the tribe will seek to adopt. This rule does not have a substantial direct effect on one or more Indian tribes. It does not create any additional requirements beyond those of the SO_2 NAAQS. This rule establishes the designations for certain areas of the country for the SO_2 NAAQS, but no areas of Indian country are being designated in this action. Furthermore, this rule does not affect the relationship or distribution of power and responsibilities between the federal government and Indian tribes. The CAA and the TAR establish the relationship of the federal government and tribes in developing plans to attain the NAAQS, and this rule does nothing to modify that relationship. Thus, Executive Order 13175 does not apply.

Although Executive Order 13175 does not apply to this rule, after the EPA promulgated the 2010 primary SO_2 NAAQS, the EPA communicated with tribal leaders and environmental staff regarding the designations process. The EPA also sent individualized letters to all federally recognized tribes to explain the designation process for the 2010 primary SO_2 NAAQS, to provide the EPA designations guidance, and to offer consultation with the EPA. The EPA provided further information to tribes through presentations at the National Tribal Forum and through participation in National Tribal Air Association conference calls. The EPA also sent individualized letters to all federally recognized tribes that submitted recommendations to the EPA about the EPA's intended designations for the SO_2 standard and offered tribal leaders the opportunity for consultation. These communications provided opportunities for tribes to voice concerns to the EPA about the general designations process for the 2010 primary SO_2 NAAQS, as well as concerns specific to a tribe, and informed the EPA about key tribal concerns regarding designations as the rule was under development. For this supplemental round of SO_2 designations action, the EPA sent additional letters to tribes that could potentially be affected and offered additional opportunities for participation in the designations process. The communication letters to the tribes are provided in the dockets for Round 1 designations (Docket ID No. EPA–HQ–OAR–2012–0233) and Round 2 designations (Docket ID No. EPA–HQ–OAR–2014–0464).

G. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks

The action is not subject to Executive Order 13045 because it is not an economically significant regulatory action as defined in Executive Order 12866. While not subject to the Executive Order, this final action may be especially important for asthmatics, including asthmatic children, living in SO_2 nonattainment areas because respiratory effects in asthmatics are among the most sensitive health endpoints for SO_2 exposure. Because asthmatic children are considered a sensitive population, the EPA evaluated the potential health effects of exposure to SO_2 pollution among asthmatic children as part of the EPA's prior action establishing the 2010 primary SO_2 NAAQS. These effects and the size of the population affected are summarized in the EPA's final SO_2 NAAQS rules. *See http://www3.epa.gov/ttn/naaqs/standards/so2/fr/20100622.pdf.*

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

This action is not subject to Executive Order 13211, because it is not a significant regulatory action under Executive Order 12866.

I. National Technology Transfer and Advancement Act (NTTAA)

This action does not involve technical standards.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

The EPA believes this action does not have disproportionately high and adverse human health or environmental effects on minority populations, low-income populations and or indigenous peoples, as specified Executive Order 12898 (59 FR 7629, February 16, 1994). The documentation for this decision is contained in Section IX of this document.

K. Congressional Review Act (CRA)

The CRA, 5 U.S.C. 801 *et seq.,* as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the U.S. The EPA will submit a report containing this action and other required information to the U.S. Senate, the U.S. House of Representatives and the Comptroller General of the U.S. prior to publication of the rule in the **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a "major rule" as defined by 5 U.S.C. 804(2). This rule will be effective January 12, 2017.

L. Judicial Review

Section 307 (b) (1) of the CAA indicates which Federal Courts of Appeal have venue for petitions for review of final actions by the EPA. This section provides, in part, that petitions for review must be filed in the Court of Appeals for the District of Columbia Circuit: (i) When the agency action consists of "nationally applicable

regulations promulgated, or final actions taken, by the Administrator,'' or (ii) when such action is locally or regionally applicable, if ''such action is based on a determination of nationwide scope or effect and if in taking such action the Administrator finds and publishes that such action is based on such a determination.''

This final action designating areas for the 2010 primary SO_2 NAAQS is ''nationally applicable'' within the meaning of section 307(b)(1). As explained in the preamble, this final action supplements the June 30, 2016 final action taken by the EPA to issue a second round of designations for areas across the U.S. for the 2010 primary SO_2 NAAQS. EPA determined the June 30, 2016 final action was ''nationally applicable'' within the meaning of section 307(b)(1). 81 FR 45045. The rulemaking docket, EPA–HQ–OAR–2014–0464, is the same docket for both the June 30, 2016 action and for this supplemental action, with the relevant difference being that in addition to the materials it contained regarding these four Texas areas generated through June 30, 2016—the date that action was signed by the Administrator—it now also contains the final technical support documents and responses to comments related to these four areas. Both the June 30, 2016 action and this supplemental action were proposed in a single March 1, 2016, notice announcing the EPA's intended Round 2 designations and were taken to discharge a duty under the court order to issue a round of designations of areas with sources meeting common criteria in the court order. As explained in the June 30, 2016 final rule, at the core of that final action and this supplemental final action is the EPA's interpretation of the definitions of nonattainment, attainment and unclassifiable under section 107(d)(1) of the CAA, and its application of that interpretation to areas across the country. *Id.* Accordingly, the Administrator has determined that this supplemental final action, which results from the same proposed action as the June 30, 2016 final action, is nationally applicable and is hereby publishing that finding in the **Federal Register**.

For the same reasons, the Administrator also is finding that this supplemental final action is based on a determination of nationwide scope and effect for the purposes of section 307(b)(1). As previously explained in the June 30, 2016 final action, in the report on the 1977 Amendments that revised section 307(b)(1) of the CAA, Congress noted that the Administrator's determination that an action is of ''nationwide scope or effect'' would be appropriate for any action that has a scope or effect beyond a single judicial circuit. H.R. Rep. No. 95–294 at 323, 324, *reprinted* in 1977 U.S.C.C.A.N. 1402–03. 81 FR 45045. Here, the June 30, 2016 final action and this supplemental final action combined issue designations in 65 areas in 24 states and extend to numerous judicial circuits. In these circumstances, section 307(b)(1) and its legislative history calls for the Administrator to find the action to be of ''nationwide scope or effect'' and for venue to be in the D.C. Circuit. Therefore, like the June 30, 2016 final action it supplements, *see* 81 FR at 45045, this final action is based on a determination by the Administrator of nationwide scope or effect, and the Administrator is hereby publishing that finding in the **Federal Register**.

Thus, any petitions for review of these final designations must be filed in the Court of Appeals for the District of Columbia Circuit within 60 days from the date final action is published in the **Federal Register**.

List of Subjects in 40 CFR Part 81

Environmental protection, Air pollution control, National parks, Wilderness areas.

Dated: November 29, 2016.

Gina McCarthy,

Administrator.

For the reasons set forth in the preamble, 40 CFR part 81 is amended as follows:

PART 81—DESIGNATIONS OF AREAS FOR AIR QUALITY PLANNING PURPOSES

* 1. The authority citation for part 81 continues to read as follows:

Authority: 42 U.S.C. 7401, *et seq.*

Subpart C—Section 107 Attainment Status Designations

* 2. Section 81.344 is amended by revising the table titled ''Texas—2010 Sulfur Dioxide NAAQS (Primary)'' to read as follows:

§81.344 Texas.

* * * * *

TEXAS—2010 SULFUR DIOXIDE NAAQS (PRIMARY)

Designated area	Designation	
	Date	Type
Freestone and Anderson Counties, TX [1]	1/12/17	Nonattainment.
Freestone County (part) and Anderson County (part)		
Those portions of Freestone and Anderson Counties encompassed by the rectangle with the vertices using Universal Traverse Mercator (UTM) coordinates in UTM zone 14 with datum NAD83 as follows:		
(1) Vertices—UTM Easting (m) 766752.69, UTM Northing (m) 3536333.0,		
(2) vertices—UTM Easting (m) 784752.69, UTM Northing (m) 3536333.0,		
(3) vertices—UTM Easting (m) 784752.69, UTM Northing (m) 3512333.0,		
(4) vertices—UTM Easting (m) 766752.69, UTM Northing (m) 3512333.0		
Rusk and Panola Counties, TX [1]	1/12/17	Nonattainment.
Rusk County (part) and Panola County (part)		
Those portions of Rusk and Panola Counties encompassed by the rectangle with the vertices using Universal Traverse Mercator (UTM) coordinates in UTM zone 15 with datum NAD83 as follows:		
(1) Vertices—UTM Easting (m) 340067.31, UTM Northing (m) 3575814.75		
(2) vertices—UTM Easting (m) 356767.31, UTM Northing (m) 3575814.75		
(3) vertices—UTM Easting (m) 356767.31, UTM Northing (m) 3564314.75		
(4) vertices—UTM Easting (m) 340067.31, UTM Northing (m) 3564314.75		
Titus County, TX [1]	1/12/17	Nonattainment.
Titus County (part)		
That portion of Titus County encompassed by the rectangle with the vertices using Universal Traverse Mercator (UTM) coordinates in UTM zone 15 with datum NAD83 as follows:		

TEXAS—2010 SULFUR DIOXIDE NAAQS (PRIMARY)—Continued

Designated area	Designation	
	Date	Type
(1) Vertices—UTM Easting (m) 304329.030, UTM Northing (m) 3666971.0, (2) vertices—UTM Easting (m) 311629.030, UTM Northing (m) 3666971.0, (3) vertices—UTM Easting (m) 311629.03, UTM Northing (m) 3661870.5, (4) vertices—UTM Easting (m) 304329.03, UTM Northing (m) 3661870.5		
Milam County, TX [1]	1/12/17	Unclassifiable.
Milam County, TX		
Potter County, TX [1]	9/12/16	Unclassifiable.
Potter County, TX		
Atascosa County, TX [1]	9/12/16	Unclassifiable/Attainment.
Atascosa County, TX		
Fort Bend County, TX [1]	9/12/16	Unclassifiable/Attainment.
Fort Bend County		
Goliad County, TX [1]	9/12/16	Unclassifiable/Attainment.
Goliad County		
Lamb County, TX [1]	9/12/16	Unclassifiable/Attainment.
Lamb County		
Limestone County, TX [2]	9/12/16	Unclassifiable/Attainment.
Limestone County		
McLennan County, TX [2]	9/12/16	Unclassifiable/Attainment.
McLennan County, TX		
Robertson County, TX [2]	9/12/16	Unclassifiable/Attainment.
Robertson County		

[1] Excludes Indian country located in each area, if any, unless otherwise specified.
[2] Includes Indian country located in each area, if any, unless otherwise specified.

* * * * *

[FR Doc. 2016–29561 Filed 12–12–16; 8:45 am]
BILLING CODE 6560–50–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 622

[Docket No. 130312235–3658–02]

RIN 0648–XF058

Fisheries of the Caribbean, Gulf of Mexico, and South Atlantic; Re-Opening of the Commercial Sector for South Atlantic Vermilion Snapper

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Temporary rule; re-opening.

SUMMARY: NMFS announces the re-opening of the commercial sector for vermilion snapper in the exclusive economic zone (EEZ) of the South Atlantic through this temporary rule. The most recent commercial landing data for vermilion snapper indicate the commercial annual catch limit (ACL) for the July through December 2016 fishing season has not yet been reached. Therefore, NMFS re-opens the commercial sector for vermilion snapper in the South Atlantic EEZ for 2 days to allow the commercial ACL to be caught, while minimizing the risk of the commercial ACL being exceeded.

DATES: This rule is effective 12:01 a.m., local time, December 14, 2016, until 12:01 a.m., local time, December 16, 2016.

FOR FURTHER INFORMATION CONTACT: Mary Vara, NMFS Southeast Regional Office, telephone: 727–824–5305, email: *mary.vara@noaa.gov.*

SUPPLEMENTARY INFORMATION: The snapper-grouper fishery of the South Atlantic includes vermilion snapper and is managed under the Fishery Management Plan for the Snapper-Grouper Fishery of the South Atlantic Region (FMP). The FMP was prepared by the South Atlantic Fishery Management Council and is implemented by NMFS under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) by regulations at 50 CFR part 622.

The commercial ACL (equal to the commercial quota) for vermilion snapper in the South Atlantic is divided into separate quotas for two 6-month time periods each year, January through June and July through December. For the July through December 2016 period, the commercial quota is 388,703 lb (176,313 kg, gutted weight, 431,460 lb (195,707 kg), round weight), as specified in 50 CFR 622.190(a)(4)(ii)(D).

On July 1, 2016, the commercial fishing season opened for the second period of July through December for this fishing year. Under 50 CFR 622.191(a)(6)(ii), NMFS is required to reduce the commercial trip limit for vermilion snapper from 1,000 lb (454 kg), gutted weight, 1,110 lb (503 kg), round weight, when 75 percent of the respective fishing season commercial quota is reached or projected to be reached. Accordingly, on August 25, 2016 (81 FR 58411), NMFS published a temporary rule in the **Federal Register** to reduce the commercial trip limit for vermilion snapper in or from the EEZ of the South Atlantic for the July through December 2016 period to 500 lb (227 kg), gutted weight. The commercial trip limit reduction was effective at 12:01 a.m., local time, August 28, 2016.

Under 50 CFR 622.193(f)(1), NMFS is required to close the commercial sector for vermilion snapper when the

Exhibit B

Big Brown Steam Electric Monitor Placement Evaluation

Source Information

- Name: Big Brown Steam Electric Station (Big Brown) (Figure 2)
- Owner: Luminant Generation Company, LLC
- Facility function: electric generation
- Location: 31.81989, -96.05457, Texas Commission on Environmental Quality (TCEQ) Region 9, Freestone County, Texas
- Sulfur dioxide (SO_2) emissions data: 62,494 tons (2013), 57,460 tons (2014)
- Long-term emissions trend: decreasing, 15 percent (%) decrease from 2010 to 2014
- Emission profile: operational year-round
- Stack height(s): two stacks, S-1 and S-2, each 122 meters (m) high, currently active
- SO_2 emission controls: multiple fabric filters and electrostatic precipitators
- Permit related data: Federal Operating Permit number 065

Existing Air Monitoring Sites

The TCEQ operates three ambient air monitoring sites within a 100 kilometer (km) radius of Big Brown. Table 1 details the three closest monitoring sites in order of proximity. Maximum SO_2 ground level concentrations can be expected close to the source. Although two of these locations are currently monitoring SO_2, none of the existing sites are within reasonable proximity to the source to characterize maximum SO_2 concentrations.

Table 1: Air Monitoring Sites Near Big Brown

Site	Distance from Big Brown	Current Sulfur Dioxide (SO_2) Monitoring	SO_2 Design Value (2013–2015)
Corsicana Airport	40 km northwest	Yes	39 parts per billion (ppb)
Tyler Airport Relocated	84 km southwest	No	Not applicable
Waco Mazanec	98 km northwest	Yes	7 ppb

km – kilometer

Big Brown Steam Electric Monitor Placement Evaluation

Settings and Surroundings

The primarily rural area surrounding Big Brown is located in the northern portion of the Southern Post Oak Savanna ecoregion of the East Central Texas Plains. This area is characterized by a mix of post oak woods, improved pasture, and rangeland (Griffith et al. 2004). The elevation ranges from 91 m to 147 m as shown in Figure 1. The area is speckled with inactive oil and gas drilling pad sites with no access to electrical power. No significant changes to the landscape were noted during the reconnaissance as compared to the satellite image shown in Figure 6. Due to minimal geographical obstructions, wind patterns are highly consistent across the Central Texas area. Mountain and valley wind channeling, or other terrain related meteorological impacts, are not expected in this area.

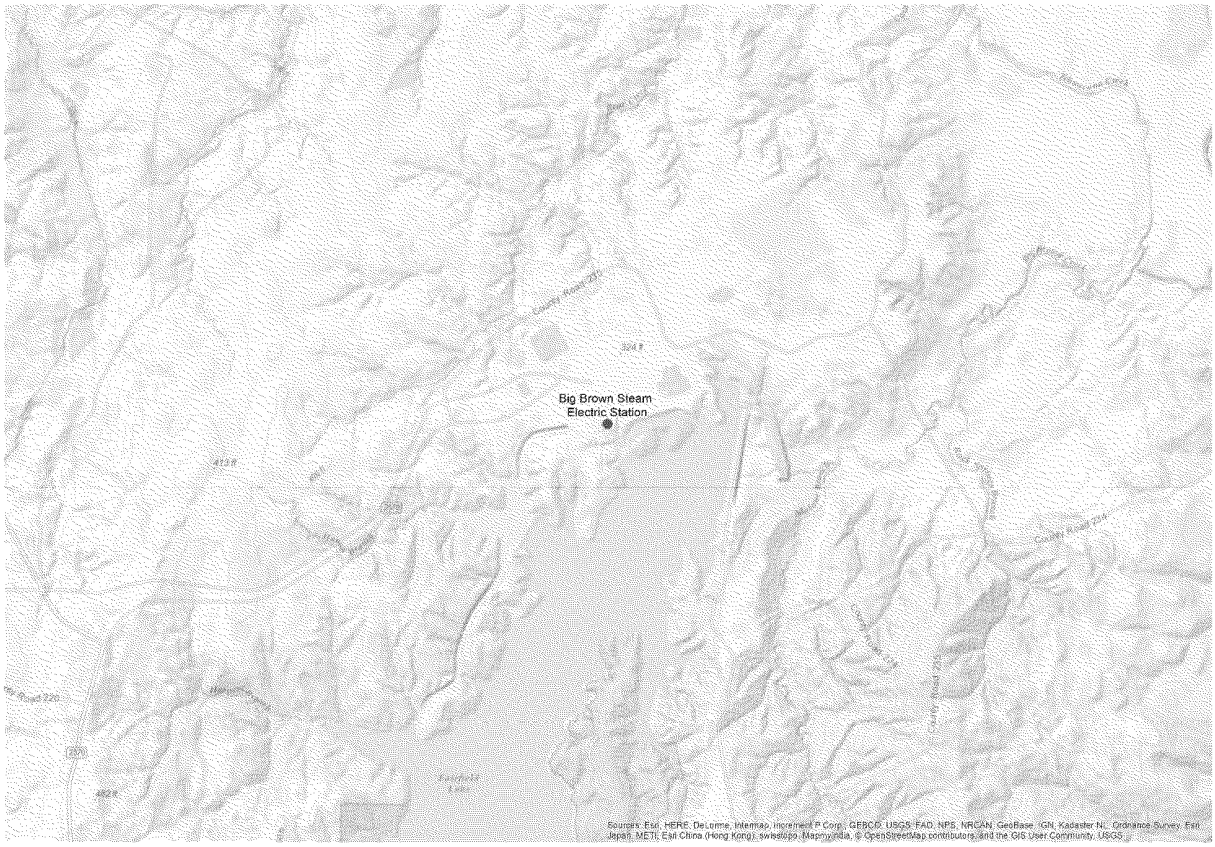


Figure 1: Big Brown Area Elevation Map

Big Brown Steam Electric Monitor Placement Evaluation

Figure 2: Big Brown Sulfur Dioxide (SO_2) Stacks and Emissions, 2013

TPY – tons per year

Big Brown Steam Electric Monitor Placement Evaluation

Meteorological Data

Figure 3 provides illustrations of area annual average wind speed and direction for 2012, 2013, and 2014 from meteorological sensors at the Corsicana Municipal Airport, located 40 km northwest of Big Brown. Figure 4 illustrates the 2012-2014 annual average wind speed. The length of each wind rose bar corresponds to the frequency of the wind coming from the indicated direction by percentage. Based on the analysis of the 2012-2014 wind data, the dominant wind flow direction for the area is 135 degrees southeast to 220 degrees south-southwest. Approximately 47% of the average area wind flows move from these directions. Over this three year period, calm winds (0-2 miles per hour) occurred on average 8% of the time, and wind speeds averaged 8.9 miles per hour (Iowa Environmental Mesonet 2016).

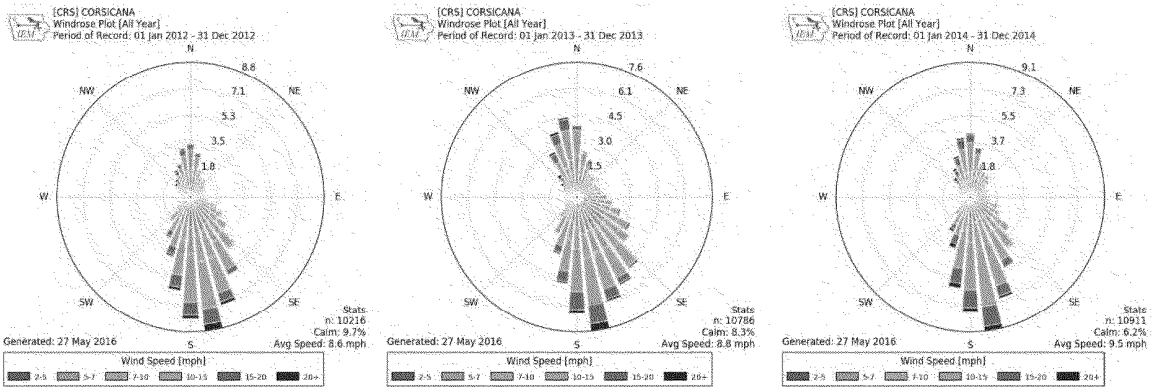


Figure 3: (From left to right) 2012, 2013, and 2014 Individual Wind Rose Plots

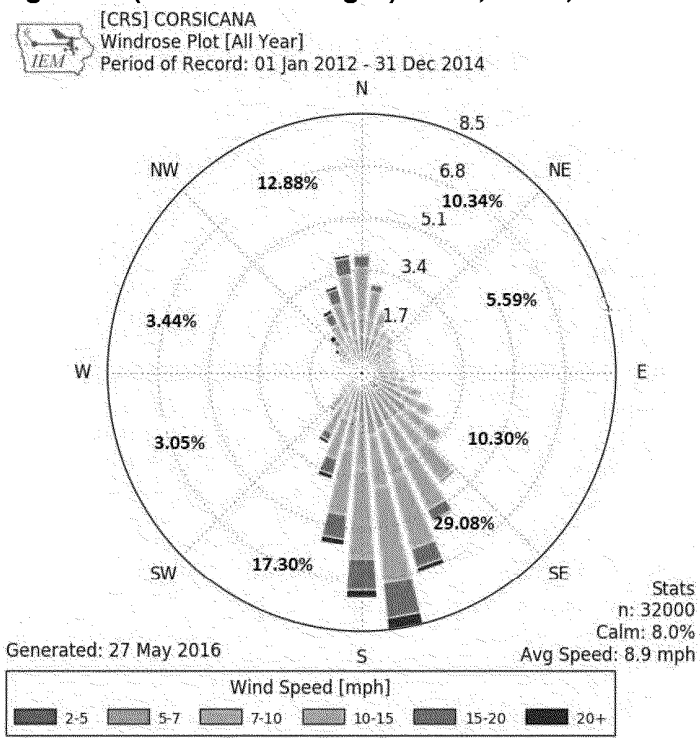


Figure 4: 2012–2014 Combined Average Wind Rose Plot

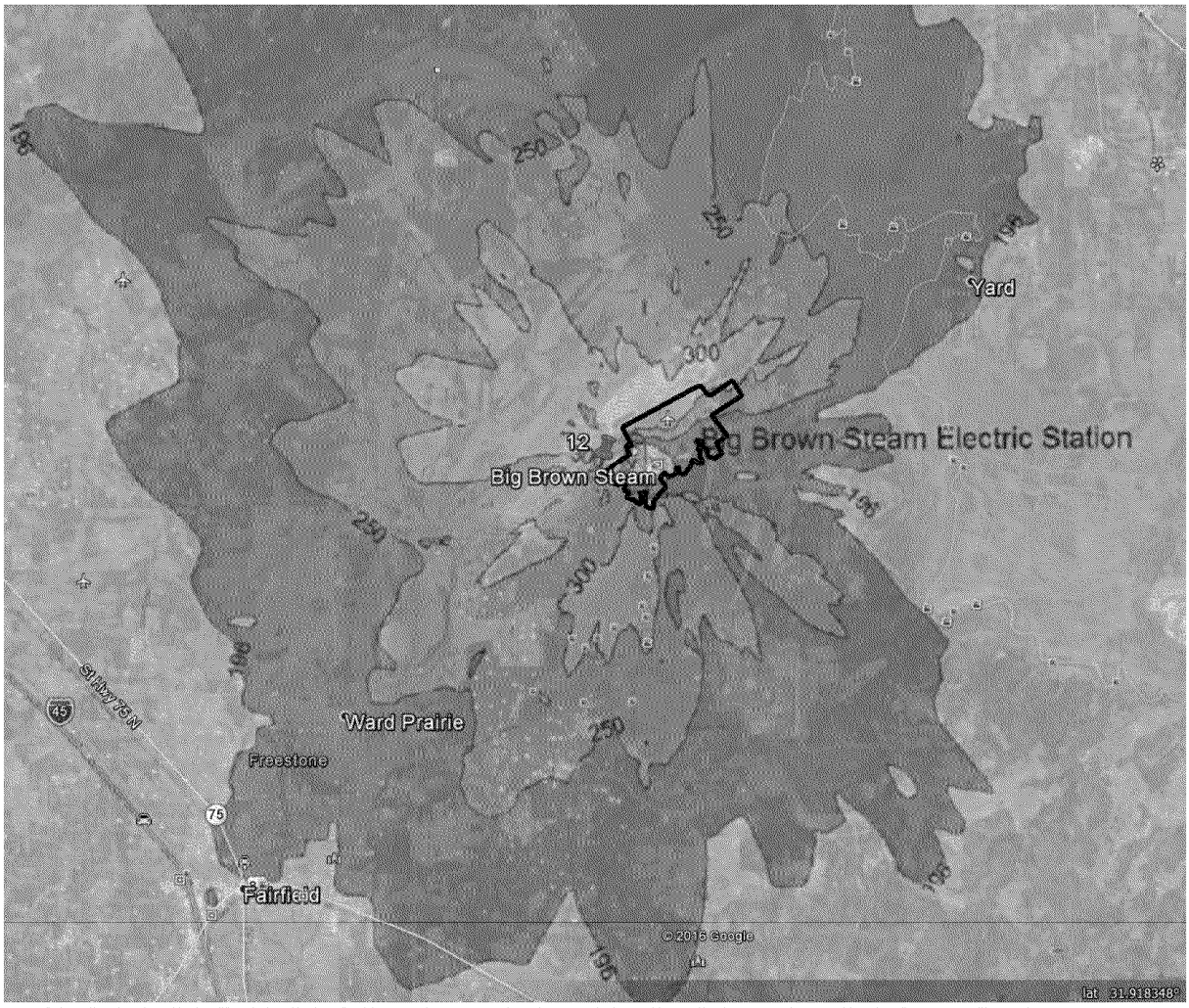
Big Brown Steam Electric Monitor Placement Evaluation

Modeling Analysis for Monitoring Site Placement

The *SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document* (Monitoring TAD) suggests that modeling is one technique that may be used to assist in identifying potential monitoring sites. The*SO_2 NAAQS Designations Modeling Technical Assistance Document* (Modeling TAD) notes that for area designations under the 2010 SO_2 National Ambient Air Quality Standard (NAAQS), the AERMOD modeling system should be used unless use of an alternative model can be justified.

In developing area designations for the 2010 SO_2 NAAQS, AERMOD modeling provided by the Sierra Club was cited in the *Texas Technical Support Document* (EPA docket ID number, EPA-HQ-OAR-2014-0464-0144) as the sole modeling analysis used by the EPA to inform their proposed designation for Big Brown. Given the EPA's reliance on the Sierra Club's modeling for designation purposes, and to facilitate consistency in the EPA's review, the TCEQ has chosen to use this modeling to inform SO_2 monitor placement recommendations near Big Brown. The use of the Sierra Club's modeling for monitor placement decisions does not infer the TCEQ's concurrence with the use of this modeling analysis for any other purpose. Figure 5 illustrates the Sierra Club's modeled impacts for the 2012-2014 actual facility emissions with the TCEQ viable air monitoring site identified with a green pin.

Big Brown Steam Electric Monitor Placement Evaluation



1-hour average SO2 concentrations (ug per cubic meter) - All colored areas exceed the NAAQS.

196 250 300

SO_2 – sulfur dioxide
µg – micrograms
NAAQS – National Ambient Air Quality Standards

Scale
(red) – 196–250 micrograms per cubic meter (µg/m^3) average SO_2 concentrations
(orange) – 251–300 µg/m^3 average SO_2 concentrations
(yellow) – greater than 300 µg/m^3 average SO_2 concentrations

Figure 5: Sierra Club's Modeled Impacts Using Actual Emissions from 2012–2014 for the Big Brown Steam Electric Station Analysis Area

Big Brown Steam Electric Monitor Placement Evaluation

Siting Options and Criteria

The TCEQ does not have SO_2 monitors located in the area surrounding Big Brown that would be expected to characterize the highest SO_2 concentrations from this facility. Therefore, a new site is proposed. The TCEQ focused on complying with the federal requirements listed in 40 Code of Federal Regulations (CFR) Part 58, Appendix E regarding siting criteria. In addition, the TCEQ evaluated areas for a monitoring site location that would appropriately and sufficiently characterize air quality around an SO_2

emissions source. This approach included utilizing multiple techniques and guidance provided in the Monitoring TAD, such as modeling, local wind roses that reflect data from 2012-2014, and area site reconnaissance.

The modeling analysis provided in Figure 5 suggests that off-property maximum SO_2 concentrations are expected to occur northeast, north, northwest, and west of the Big Brown facility, with isolated pockets of higher and lower concentrations. According to the technical support document, the highest predicted model concentration of SO_2 based on actual emissions from the facility is expected northwest of Big Brown, with concentrations above 300 micrograms per cubic meter ($\mu g/m^3$). The single highest modeled value occurred approximately 4 km to the northwest of the facility center. Modeled concentrations above 300 $\mu g/m^3$ were also predicted southwest of the facility.

Many areas with anticipated high SO_2 concentrations are not viable for monitoring site deployment due to a large water body south to southwest of Big Brown, lack of electrical power, dense vegetation, or averse property owners. Figure 6 depicts the twelve potential monitoring site locations that were identified in the area (red and green pins) and the Big Brown permitted property line (black). Eleven of the twelve identified potential sites (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11) are not considered viable and are indicated by red pins. Property owners of sites 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 either declined monitor placement on the property or were unresponsive. Sites 1, 7, and 10 are in areas frequented by mine machinery and heavy trucks. Sites 1, 8, and 10 are within the permitted property. Sites 7, 8, and 10 have limited or no vehicle accessibility. Sites 8 and 11 lack sufficient space for monitor placement. Sites 3 and 8 have no accessible electrical power. Sites 3 and 4 are on hunting leases. A portion of the property near site 3 is used for water treatment. Site 4 is leased to a state park. Site 5 has tall trees and dense vegetation. The property owner of site 8 refused access to the property. Site 10 is in an area with active mining, and the areas surrounding the active mine are in various stages of post-mining vegetative recovery. Site 11 is obstructed by the nearby power lines.

Site 12 has satisfactory logistical and siting characteristics (indicated with a green pin in Figures 5, 6, and 8) and is located approximately 1.4 km west of Big Brown in an area anticipated to experience elevated SO_2 concentrations. This site is downwind of the source when winds are from the east, approximately 8%of the year on average (see Figure 4). The site offers adequate space, available power, proximity to the facility, and has clear access (see section “Recommendation” and Table 2). The property owner is amenable to a site agreement.

Big Brown Steam Electric Monitor Placement Evaluation

Recommendation

Pursuant to 40 CFR Sections 51.1201 and 51.1203, the TCEQ recommends an air monitoring station near Big Brown to collect and submit air quality data characterizing potential maximum 1-hour ambient SO_2 concentrations in the area. According to the regulations, the level of the national primary 1-hour annual ambient air quality standard for SO_2 shall be measured at an ambient air monitoring site using a Federal Reference Method (FRM) or a Federal Equivalent Method (FEM) (40 CFR Part 50.17(c)). The TCEQ proposes to deploy an air monitoring station to characterize SO_2 levels in the area utilizing an automated equivalent method, which is considered an FEM (40 CFR Part 53).

Based on current facility operations, available emissions data, logistics, meteorological data, and modeling analyses, Site 12 (Figures 5 and 6) is the recommended location for placement of a new source-oriented ambient SO_2 monitoring station. The most influential factors constraining site placement for Big Brown were logistics (e.g., electricity, vegetation, property access, and siting criteria) and averse property owners. Appropriate siting logistics and property owner amenability are lacking in areas where modeling predicted the highest SO_2 concentrations (sites 2 and 7). The TCEQ considered additional locations based on meteorological and modeling data, but these locations were either logistically unsuitable or the property owners declined monitor placement on the property (sites 1, 3, 4, 5, 6, 8, 9, 10, and 11).

Historical meteorological data from 2012-2014 (Figure 4) indicate that the area around site 12 is downwind of Big Brown during easterly winds on average 8% of the year. Site 12 is the closest viable location to the source (1.4 km) and the model-predicted off-property maximum SO_2 concentrations with available power, adequate space, and level ground, meeting all federal siting criteria. The property owner of site 12 is amenable to a site agreement.

Big Brown Steam Electric Monitor Placement Evaluation

Figure 6: Potential Monitoring Sites for Big Brown

Big Brown Steam Electric Monitor Placement Evaluation

Table 2: Potential Sites Assessment[1]

Site Number	Big Brown #1	Big Brown #2	Big Brown #3
Location[2]	31.83006, -96.04986	31.84390, -96.08720	31.83373, -96.01967
Distance from SO_2 Source[2]	1,085 m	3,977 m	3,742 m
Wind Direction	S, SE	S, SE	S, SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	None	Yes; pond (S)	None
Wind Channeling	None	None	None
Downwind[2]	Yes (NNE)	Yes (NW)	No (ENE)
Obstructions and Height	None	None	None
Distance from Site to Obstructions	None	None	None
Road/Site Access	Yes	Yes	Yes
Electricity Available <18 m	Yes	Yes	No
Pros	❑ Downwind ❑ Level ground ❑ Power available ❑ Space available ❑ Close proximity to source ❑ High SO_2 modeling	❑ Downwind ❑ Level ground ❑ Power available ❑ Space available ❑ Site access ❑ Close proximity to source ❑ High SO_2 modeling	❑ Level ground ❑ Space available ❑ Site access ❑ Close proximity to source ❑ High SO_2 modeling
Cons	❑ Difficult site access ❑ Heavy vehicle traffic ❑ Site within permitted property ❑ Property owner declined	❑ Unresponsive property owner	❑ Not downwind ❑ No power ❑ Hunting leases ❑ Water treatment area ❑ Unresponsive property owner
Viable Site (Yes, No, or Preferred)	No	No	No

Big Brown Steam Electric Monitor Placement Evaluation

Site Number	Big Brown #4	Big Brown #5	Big Brown #6
Location[2]	31.78939, -96.05603	31.78766, -96.03875	31.85023, -96.02919
Distance from SO_2 Source[2]	3,301 m	3,449 m	3,771 m
Wind Direction	S, SE	S, SE	S, SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	Yes; lake (W)	None	None
Wind Channeling	None	None	None
Downwind[2]	No (S)	No (SSE)	No (NE)
Obstructions and Height	None	Trees (7 m)	None
Distance from Site to Obstructions	None	Trees (10 m)	None
Road/Site Access	Yes	Yes	Yes
Electricity Available <18 m	Yes	Yes	Yes
Pros	☐ Level ground ☐ Power available ☐ Space available ☐ Site access ☐ Close proximity to source ☐ High SO_2 modeling	☐ Level ground ☐ Power available ☐ Space available ☐ Site access ☐ Close proximity to source ☐ High SO_2 modeling	☐ Level ground ☐ Power available ☐ Space available ☐ Site access ☐ Close proximity to source ☐ High SO_2 modeling
Cons	☐ Not downwind ☐ Hunting lease ☐ State park lease ☐ Property owner declined	☐ Not downwind ☐ Local obstructions ☐ Dense vegetation ☐ Unresponsive property owner	☐ Not downwind ☐ Unresponsive property owner
Viable Site (Yes, No, or Preferred)	No	No	No

Big Brown Steam Electric Monitor Placement Evaluation

Site Number	Big Brown #7	Big Brown #8	Big Brown #9
Location[2]	31.82308, -96.06875	31.83448, -96.05076	31.79449, -96.05867
Distance from SO_2 Source[2]	1,074 m	1,555 m	2,874 m
Wind Direction	S, SE	S, SE	S, SE
Grade	>2%	>2%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	Yes; lake (S)	None	Yes; lake (W)
Wind Channeling	None	None	None
Downwind[2]	No (WNW)	Yes (N)	No (S)
Obstructions and Height	Trees (30 m) Water tanks (4 m)	None	Trees (6 m)
Distance from Site to Obstructions	Trees (30 m W, E, NNE) Water tanks (38 m SE)	None	Trees (15 m S)
Road/Site Access	No	No	Yes
Electricity Available <18 m	No	No	Yes
Pros	❑ Space available ❑ Close proximity to source ❑ High SO_2 modeling	❑ Downwind ❑ Close proximity to source ❑ High SO_2 modeling	❑ Level ground ❑ Power available ❑ Space available ❑ Site access ❑ Close proximity to source ❑ High SO_2 modeling
Cons	❑ Not downwind ❑ Unlevel ground ❑ No power ❑ No site access ❑ Local obstructions ❑ Heavy vehicle traffic ❑ Property owner declined	❑ Unlevel ground ❑ No power ❑ No space available ❑ No site access ❑ Site within permitted property ❑ Property owner declined	❑ Not downwind ❑ Property owner declined
Viable Site (Yes, No, or Preferred)	No	No	No

Big Brown Steam Electric Monitor Placement Evaluation

Site Number	Big Brown #10	Big Brown #11	Big Brown #12
Location[2]	31.82743, -96.04744	31.82075, -96.07051	31.81998, -96.07038
Distance from SO_2 Source[2]	1,030 m	1,407 m	1,421 m
Wind Direction	S, SE	S, SE	S, SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	Yes; lake (S)	Yes; lake (SE)	Yes; lake (SE)
Wind Channeling	None	None	None
Downwind[2]	No (NE)	No (W)	No (W)
Obstructions and Height	None	Power pole (7 m)	Trees (10 m)
Distance from Site to Obstructions	None	Powerlines (7 m N, NE, E, SE, S, SW, W, NW)	Trees (27 m NW)
Road/Site Access	No	Yes	Yes
Electricity Available <18 m	Yes	Yes	Yes
Pros	☐ Level ground ☐ Power available ☐ Space available ☐ Close proximity to the source ☐ High SO_2 modeling	☐ Level ground ☐ Power available ☐ Site access ☐ Close proximity to source ☐ High SO_2 modeling ☐ Agreeable property owner	☐ Level ground ☐ Close proximity to source ☐ High SO_2 modeling ☐ Power available ☐ Space available ☐ Property owner amenable
Cons	☐ Not downwind ☐ No site access ☐ Heavy vehicle traffic ☐ Site within permitted property ☐ Mining activity ☐ Property owner declined	☐ Not downwind ☐ No space available ☐ Local obstructions	☐ Not downwind ☐ Local obstructions
Viable Site (Yes, No, or Preferred)	No	No	Preferred

[1]Based on 40 Code of Federal Regulations Part 58 and *SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document*
[2]Based on Google Earth

E – east
m – meter
N – north
NE – northeast
NNE – north-northeast
NW – northwest
S – south
SE – southeast
SO_2 – sulfur dioxide
ENE – east-northeast
SSE – south-southeast
SW – southwest
W – west
WNE – west-northwest
> – greater than
< – less than
– number
% – percent

Big Brown Steam Electric Monitor Placement Evaluation

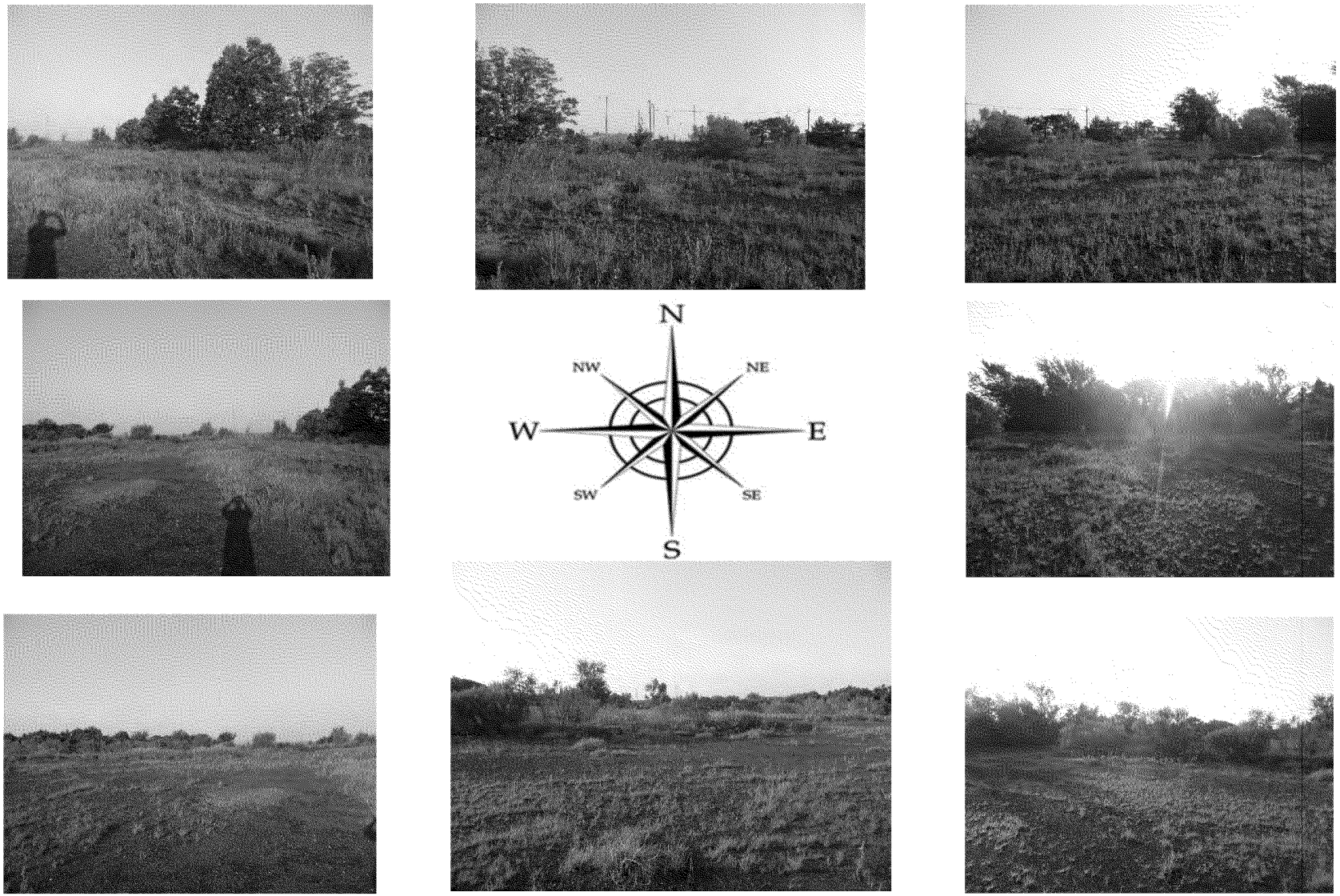


Figure 7: Big Brown Potential Site #12 Cardinal Direction Photos

Figure 8: Big Brown Potential Site #12 Satellite Image

References

Griffith, G. E., S. A. Bryce, J. M. Omernik, J. A. Comstock, A. C. Rogers, B. Harrison, S. L. Hatch, and D. Bezanson. *Ecoregions of Texas.* (2 sided color poster with map, descriptive text, summary tables, and photographs). Reston, Virginia: U.S. Geological Survey, 2004. Scale 1:2,500,000.

"IEM : Site Locator." Iowa Environmental Mesonet. 2016. Accessed April 06, 2016. https://mesonet.agron.iastate.edu/sites/locate.php?network=TX_ASOS.

U.S. EPA. EPA Docket ID: EPA-HQ-OAR-2014-0464. *Texas Technical Support Document – Area Designations for the 2010 SO_2 Primary National Ambient Air Quality Standard (EPA-HQ-OAR-2014-0464-0144).* pp. 182-200. 2016. Accessed October 6, 2016. https://www.regulations.gov/docket?D=EPA-HQ-OAR-2014-0464.

Exhibit C

Martin Lake Electrical Monitor Placement Evaluation

Source Information

- Name: Martin Lake Electrical Station (Martin Lake) (Figure 2)
- Owner: Luminant Generation Company, LLC
- Facility function: electric generation
- Location: 32.25965, -94.57033, Texas Commission on Environmental Quality (TCEQ) Region 5, Rusk County, Texas
- Sulfur dioxide (SO_2) emissions data: 62,735 tons (2013), 53,660 tons (2014)
- Long-term emissions trend: decreasing, 10 percent (%) decrease from 2010 to 2014
- Emission profile: operational year-round
- Stack height(s): three stacks, S-1, S-2, and S-3, each 138 meters (m) high, currently active
- SO_2 emission controls: multiple wet scrubbers, electrostatic precipitators, and fabric filters
- Permit related data: Federal Operating Permit number 053

Existing Air Monitoring Sites

The TCEQ operates three ambient air monitoring sites within a 100 kilometer (km) radius of Martin Lake. Table 1 details the three closest monitoring sites in order of proximity. Maximum SO_2 ground level concentrations can be expected close to the source. Although one location currently monitors SO_2, none of the existing sites are within reasonable proximity to the source to characterize maximum SO_2 concentrations.

Table 1: Air Monitoring Sites Near Martin Lake

Site	Distance from Martin Lake	Current Sulfur Dioxide (SO_2) Monitoring	SO_2 Design Value (2013–2015)
Longview	18 km northwest	No	Not applicable
Karnack	60 km northeast	Yes	46 parts per billion
Tyler Airport Relocated	79 km west	No	Not applicable

km – kilometer

Martin Lake Electrical Monitor Placement Evaluation

Settings and Surroundings

The primarily rural area surrounding Martin Lake is located in the southern portion of the Tertiary Uplands ecoregion of the South Central Plains. This area is the western edge of the southern coniferous forest belt and blanketed by dense pine and hardwood forests (Griffith et al. 2004). The elevation is roughly 122 m as shown in Figure 1. The area is speckled with inactive oil and gas drilling pad sites with limited power accessibility. During reconnaissance it was noted that the vegetation was significantly thicker and the trees were significantly taller in some locations as compared to the satellite image shown in Figure 6. Mountain and valley wind channeling, or other terrain related meteorological impacts, are not expected in this area.

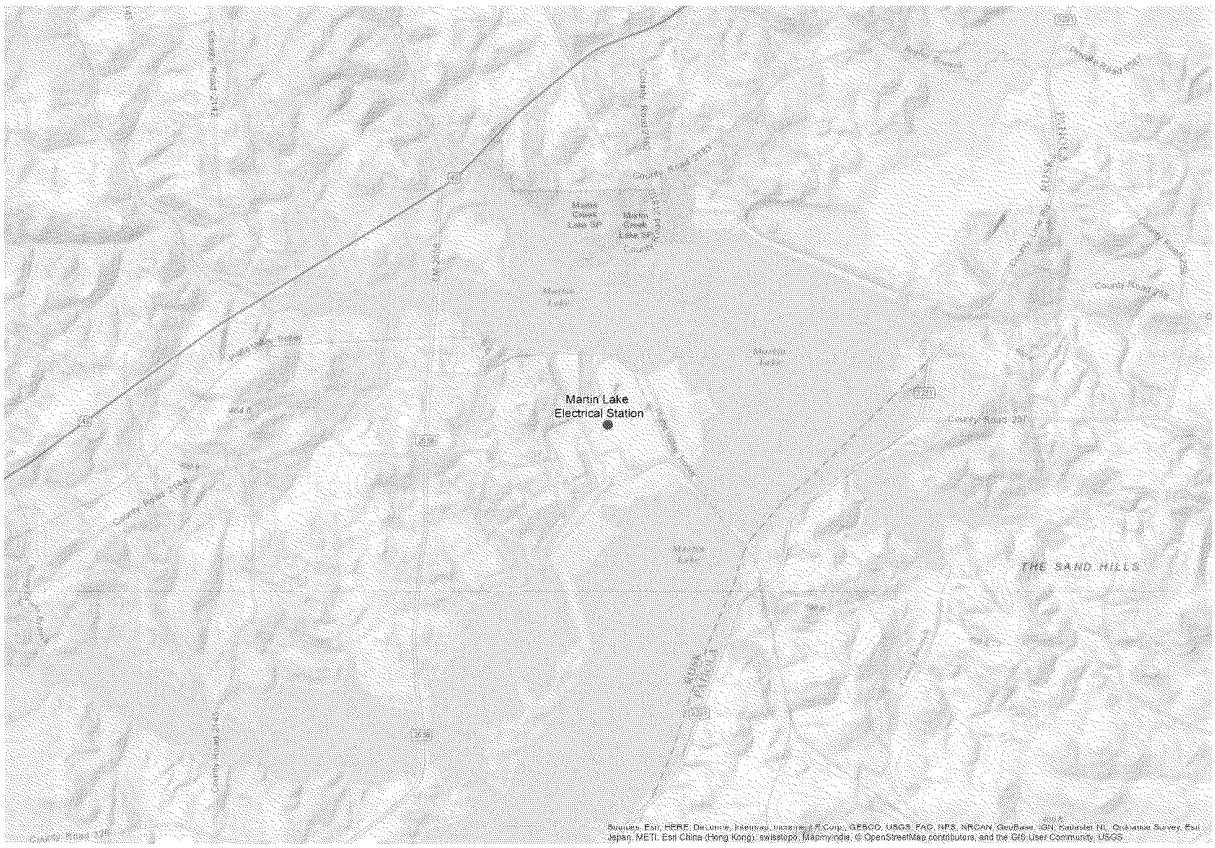


Figure 1: Martin Lake Area Elevation Map

Martin Lake Electrical Monitor Placement Evaluation

Figure 2: Martin Lake Sulfur Dioxide (SO_2) Stacks and Emissions, 2013
TPY – tons per year

Martin Lake Electrical Monitor Placement Evaluation

Meteorological Data

Figure 3 provides illustrations of area annual average wind speed and direction for 2012, 2013, and 2014 from meteorological sensors at the Longview Airport, located 18 km northwest of Martin Lake. Figure 4 illustrates the 2012-2014 annual average wind speed. The length of each wind rose bar corresponds to the frequency of the wind coming from the indicated direction by percentage. Based on the analysis of the 2012-2014 wind data, the dominant wind flow direction for the area is 125 degrees southeast to 215 degrees south-southwest. Approximately 40% of the average area wind flows move from these directions. Over this three year period, calm winds (0-2 miles per hour) occurred on average 19% of the time, and wind speeds averaged 6.9 miles per hour (Iowa Environmental Mesonet 2016).

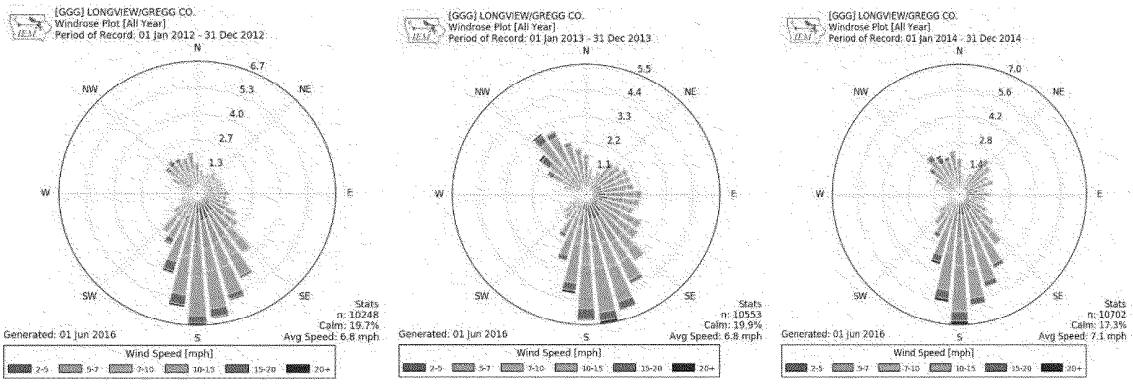


Figure 3: (From left to right) 2012, 2013, and 2014 Individual Wind Rose Plots

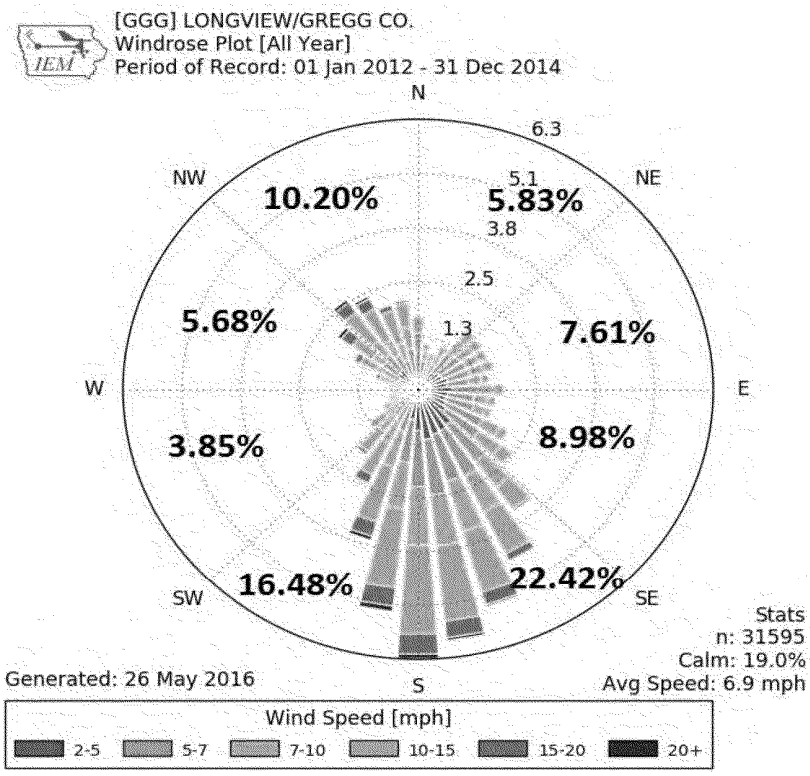


Figure 4: 2012-2014 Combined Average Wind Rose Plot

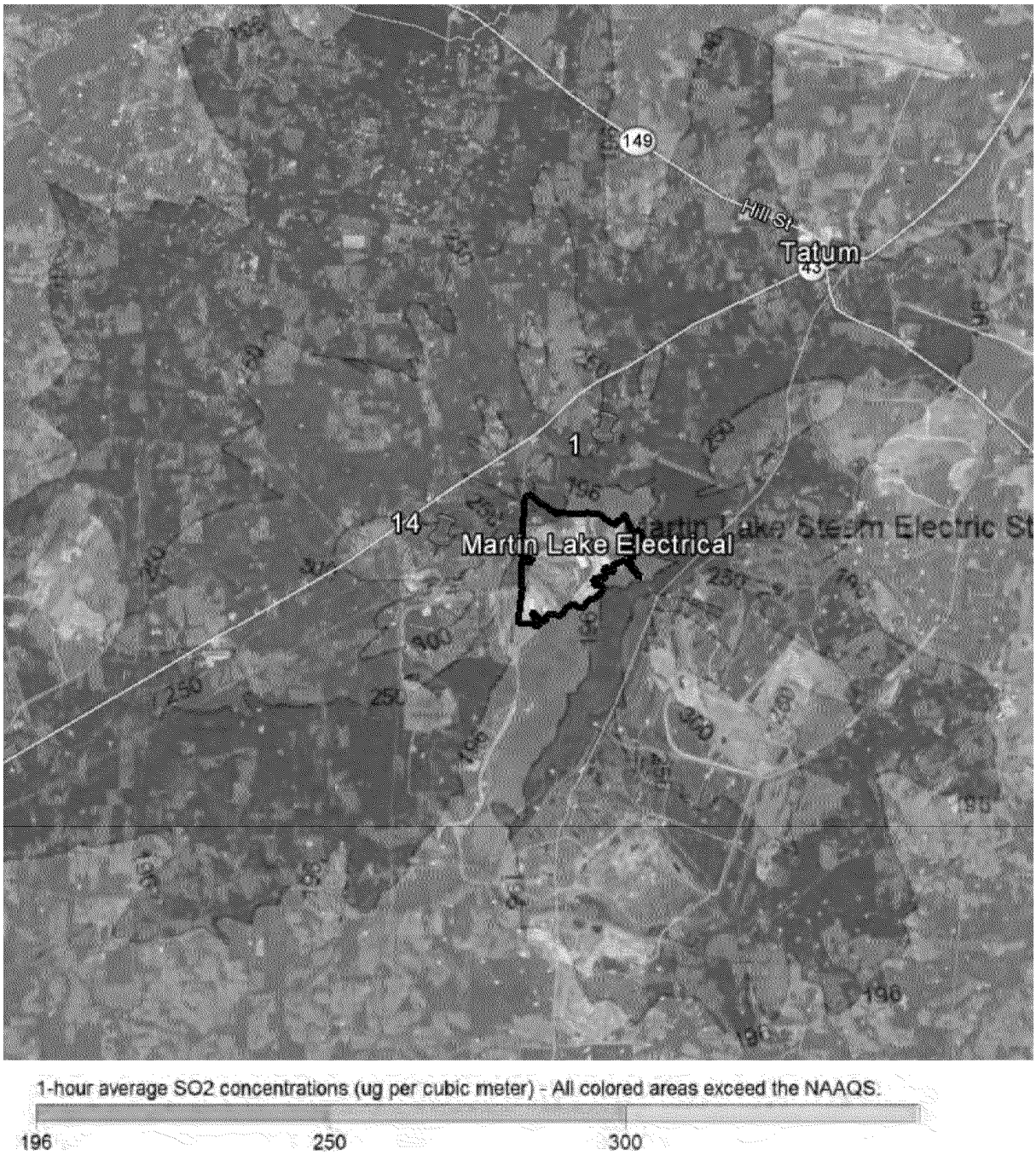
Martin Lake Electrical Monitor Placement Evaluation

Modeling Analysis for Monitoring Site Placement

The *SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document* (Monitoring TAD) suggests that modeling is one technique that may be used to assist in identifying potential monitoring sites. The *SO_2 NAAQS Designations Modeling Technical Assistance Document* (Modeling TAD) notes that for area designations under the 2010 SO_2 National Ambient Air Quality Standard (NAAQS), the AERMOD modeling system should be used, unless use of an alternative model can be justified.

In developing area designations for the 2010 SO_2 NAAQS, AERMOD modeling provided by the Sierra Club was cited in the *Texas Technical Support Document* (EPA docket ID number, EPA-HQ-OAR-2014-0464-0144) as the sole modeling analysis used by the EPA to inform their proposed designation for Martin Lake. Given the EPA's reliance on the Sierra Club's modeling for designation purposes, and to facilitate consistency in the EPA's review, the TCEQ has chosen to use this modeling to inform SO_2 monitor placement recommendations near Martin Lake. The use of the Sierra Club's modeling for monitor placement decisions does not infer the TCEQ's concurrence with the use of this modeling analysis for any other purpose. Figure 5 illustrates the Sierra Club's modeled impacts for the 2012-2014 actual facility emissions with the TCEQ viable air monitoring sites identified with green pins.

Martin Lake Electrical Monitor Placement Evaluation



SO_2 – sulfur dioxide
µg – micrograms
NAAQS – National Ambient Air Quality Standards

Scale
(red) – 196–250 micrograms per cubic meter (µg/m^3) average SO_2 concentrations
(orange) – 251–300 µg/m^3 average SO_2 concentrations
(yellow) – greater than 300 µg/m^3 average SO_2 concentrations

Figure 5: Sierra Club's Modeled Impacts Using Actual Emissions from 2012–2014 for the Martin Lake Electrical Station Analysis Area

Martin Lake Electrical Monitor Placement Evaluation

Siting Options and Criteria

The TCEQ does not have SO_2 monitors located in the area surrounding Martin Lake that would be expected to characterize the highest SO_2 concentrations from this facility, therefore a new site is proposed. The TCEQ focused on complying with the federal requirements listed in 40 Code of Federal Regulations (CFR) Part 58, Appendix E, regarding siting criteria. In addition, the TCEQ evaluated areas for a monitoring site location that would appropriately and sufficiently characterize air quality around an SO_2 emissions source. This approach included utilizing multiple techniques and guidance provided in the Monitoring TAD, such as modeling, local wind roses that reflect data from 2012-2014, and area site reconnaissance.

The modeling analysis provided in Figure 5 suggests that off-property maximum SO_2 concentrations are expected to occur north, northwest, west, southwest, and southeast of the Martin Lake facility, with isolated pockets of higher and lower concentrations. In addition, the highest predicted model concentration of SO_2 based on actual emissions from the facility was predicted southeast (noted as east by the Sierra Club) of Martin Lake, with predicted concentrations above 300 micrograms per cubic meter ($\mu g/m^3$). Modeled concentrations above 300 $\mu g/m^3$ were also predicted to the west-southwest and north of the facility.

Meteorological data (see Figures 3 and 4) indicate south-southwest to southeast wind directions around Martin Lake with a strong southerly component over a three year average of 40%. Easterly winds occurred approximately 16% of the time during this period and were consistently 2 to 15 miles per hour, which could result in the higher SO_2 concentrations predicted by the Sierra Club's model. Northwesterly winds ranged up to 20+ miles per hour for approximately 16% of the same time period. Northwesterly winds could also support the model predicted SO_2 concentrations to the southeast. The meteorological assessment combined with the modeling results indicated that reconnaissance to the north of Martin Lake was the priority, due to the prominent southerly wind directions, while potential sites to the west and southeast were also investigated.

Other areas with anticipated high SO_2 concentrations are not viable for monitoring site deployment due to a large water body south of Martin Lake, lack of electrical power, dense vegetation, or averse property owners. Twenty potential monitoring sites were identified in the area. Figure 6 depicts these 20 potential site locations (red and green pins) and the Martin Lake permitted property line (black). Eighteen of the twenty identified potential sites (numbers 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, and 20) are not considered viable and are indicated by red pins.

Sites 2, 3, and 4 are positioned near a boat ramp in areas with numerous obstructions. Site 2 lacks sufficient space for monitor placement. Site 5 is positioned near a cell phone tower. Sites 6 and 7 have tall trees and dense vegetation. Site 7 lacks sufficient space for monitor placement. Sites 11 and 20 are on private property with hunting leases. Sites 6, 8, 10, 12, 13, 15, 16, and 17 have limited or no vehicle accessibility. Sites 10, 12, 15, and 16 are in areas frequented by mining machinery, heavy trucks, and railcars. Site 10 is in an area with active mining, and the areas surrounding the active mine are in various stages of post-mining vegetative recovery. Sites 3, 4, 5, 6, 8, 9, 10, 13, 16, and 20 have no accessible electrical power.

Property owners of sites 5, 6, 7, and 8 either refused access to the property, or the property was unsuitable. The property owner of site 8 declined monitor placement due to its proximity to the property owner's house. Property owners of sites 3, 4, 10, 11,

12, 13, 15, 16, and 20 also declined monitor placement on their property. Property owners of sites 2, 5, 6, 7, 9, 12, 17, 18, and 19 were unresponsive to site placement inquiries.

Sites 1 and 14, indicated with green pins in Figures 5 and 6, are considered viable and meet logistical and siting criteria.

- Site 1 is located approximately 2.2 km north of the Martin Lake facility in an area anticipated to experience elevated SO_2 concentrations. This site is downwind of the source when winds are from the south, approximately 40% of the year on average (see Figure 4). The site offers adequate space, available power, is close to the facility, and is easily accessible (see section "Recommendation" and Table 2). The property owner is amenable to a site agreement.
- Site 14 is located approximately 3.6 km west of the Martin Lake facility in an area anticipated to experience elevated SO_2 concentrations. This site is downwind of the source when winds are from the east, approximately 16%of the year on average (see Figure 4). The site offers adequate space, available power, is close to the facility, and is easily accessible (see section "Recommendation" and Table 2). The property owner is amenable to a site agreement.

Recommendation

Pursuant to 40 CFR Sections 51.1201 and 51.1203, the TCEQ recommends an air monitoring station in the area near Martin Lake to collect and submit air quality data characterizing potential maximum 1-hour ambient SO_2 concentrations in the area. According to the regulations, the level of the national primary 1-hour annual ambient air quality standard for SO_2 shall be measured at an ambient air monitoring site using a Federal Reference Method (FRM) or a Federal Equivalent Method (FEM) (40 CFR Part 50.17(c)). The TCEQ proposes to deploy an air monitoring station to characterize SO_2 levels in the area utilizing an automated equivalent method, which is considered an FEM (40 CFR Part 53).

Based on current facility operations, available emissions data, wind patterns, logistics, meteorological data, and modeling analyses, Site 1 (noted as a green pin in Figures 5 and 6) is the recommended location for placement of a new source-oriented ambient SO_2 monitoring station. The most influential factors constraining site placement for Martin Lake were adverse property owners and logistics (e.g., electricity, vegetation, property access, and siting criteria). Electricity and appropriate siting logistics are lacking in areas towards the southeast where the modeling predicted the highest SO_2 concentrations (sites 9 and 10). The TCEQ considered additional locations based on meteorological and modeling data but these locations were either logistically unsuitable or the property owners declined monitor placement on the property (sites 2, 3, 4, 5, 6, 7, and 8). The Sierra Club's model also indicates elevated one-hour SO_2 average concentration southwest of the facility. However, the combination of wind rose data, modeling, and site logistics, does not support an air monitoring site in this direction.

Historical meteorological data from 2012-2014 (Figure 4) indicate the area around site 1 is downwind of Martin Lake during southerly winds, on average 40% of the year. Site 1 is the closest viable location to the source (2.2 km) and the Sierra Club's modeled impacts predict this area's SO_2 concentration to be in exceedance of the 2010 SO_2 NAAQS. This site also has available power, adequate space, and level ground, meeting all federal siting criteria. The property owner of Site 1 is amenable to a site agreement.

Martin Lake Electrical Monitor Placement Evaluation

Figure 6: Potential Monitoring Sites for Martin Lake

Martin Lake Electrical Monitor Placement Evaluation

Table 2: Potential Sites Assessment[1]

Site Number	Martin Lake #1	Martin Lake #2	Martin Lake #3
Location[2]	32.27808, -94.57084	32.27377, -94.56651	32.27591, -94.56296
Distance from SO_2 Source[2]	2,200 m	1,615 m	1,940 m
Wind Direction	SSW to SE	SSW to SE	SSW to SE
Grade	<2%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	Yes; lake (S)	Yes; lake (S)	Yes; lake (S)
Wind Channeling	None	None	None
Downwind[2]	Yes (N)	Yes (NNE)	Yes (NNE)
Obstructions and Height	Trees (12 m)	Trees (30 m)	Trees (30 m)
Distance from Site to Obstructions	Trees (43 m S, 24 m N, 107 m E)	Trees (21 m W, 63 m S)	Trees (21 m W, 63 m S)
Road/Site Access	Yes	Yes	Yes
Electricity Available <18 m	Yes	Yes	No
Pros	☐ Downwind ☐ Power available ☐ Space available ☐ Site access ☐ Close proximity to source ☐ High SO_2 modeling ☐ Agreeable property owner	☐ Downwind ☐ Level ground ☐ Power available ☐ Site access ☐ Close proximity to source ☐ High SO_2 modeling	☐ Downwind ☐ Level ground ☐ Space available ☐ Site access ☐ Close proximity to source ☐ High SO_2 modeling
Cons	☐ Local obstructions ☐ Unlevel ground	☐ No space available ☐ Local obstructions ☐ Unresponsive property owner	☐ No power ☐ Local obstructions ☐ Property owner declined
Viable Site (Yes, No, or Preferred)	Preferred	No	No

Martin Lake Electrical Monitor Placement Evaluation

Site Number	Martin Lake #4	Martin Lake #5	Martin Lake #6
Location[2]	32.27725, -94.56243	32.28261, -94.57066	32.28521, -94.56049
Distance from SO_2 Source[2]	2,100 m	2,600 m	3,010 m
Wind Direction	SSW to SE	SSW to SE	SSW to SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	Yes; lake (S)	Yes; lake (S)	Yes; lake (S)
Wind Channeling	None	None	None
Downwind[2]	Yes (NNE)	Yes (N)	Yes (NNE)
Obstructions and Height	Trees (30 m)	Trees (12 m)	Trees (12 m)
Distance from Site to Obstructions	Trees (35 m S, 68 m W)	Trees (62 m S, 102 m W)	Trees (20 m W, 35 m N, 26 m E)
Road/Site Access	Yes	Yes	No
Electricity Available <18 m	No	No	No
Pros	☐ Downwind ☐ Level ground ☐ Space available ☐ Site access ☐ Close proximity to source ☐ High SO_2 modeling	☐ Downwind ☐ Level ground ☐ Space available ☐ Site access ☐ Close proximity to source ☐ High SO_2 modeling	☐ Downwind ☐ Level ground ☐ Space available ☐ Close proximity to source ☐ High SO_2 modeling
Cons	☐ No power ☐ Local obstructions ☐ Property owner declined	☐ No power ☐ Local obstructions ☐ Unresponsive property owner	☐ No power ☐ No site access ☐ Dense vegetation ☐ Local obstructions ☐ Unresponsive property owner
Viable Site (Yes, No, or Preferred)	No	No	No

Martin Lake Electrical Monitor Placement Evaluation

Site Number	Martin Lake #7	Martin Lake #8	Martin Lake #9
Location[2]	32.28478, -94.55883	32.28332, -94.58033	32.28060, -94.58543
Distance from SO_2 Source[2]	3,000 m	2,777 m	2,706 m
Wind Direction	SSW to SE	SSW to SE	SSW to SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	Yes; lake (S)	Yes; lake (SW)	Yes; lake (SE)
Wind Channeling	None	None	None
Downwind[2]	Yes (NNE)	Yes (NNW)	Yes (NNW)
Obstructions and Height	Trees (12 m)	Trees (10 m)	Trees (15 m)
Distance from Site to Obstructions	Trees (23 m SW, 22 m E)	Trees (62 m S, 46 m W)	Trees (75 m SE)
Road/Site Access	Yes	No	Yes
Electricity Available <18 m	Yes	No	No
Pros	❑ Downwind ❑ Level ground ❑ Power available ❑ Site access ❑ Close proximity to source ❑ High SO_2 modeling	❑ Downwind ❑ Level ground ❑ Space available ❑ Close proximity to source ❑ High SO_2 modeling	❑ Downwind ❑ Level ground ❑ Space available ❑ Site access ❑ Close proximity to source ❑ High SO_2 modeling
Cons	❑ No space available ❑ Dense vegetation ❑ Local obstructions ❑ Unresponsive property owner	❑ No power ❑ No site access ❑ Local obstructions ❑ Property owner declined	❑ No power ❑ Local obstructions ❑ Unresponsive property owner
Viable Site (Yes, No, or Preferred)	No	No	No

Martin Lake Electrical Monitor Placement Evaluation

Site Number	Martin Lake #10	Martin Lake #11	Martin Lake #12
Location[2]	32.23796, -94.55886	32.26160, -94.61984	32.25520, -94.61596
Distance from SO_2 Source[2]	2,652 m	4,558 m	4,239 m
Wind Direction	SSW to SE	SSW to SE	SSW to SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	Yes; lake (W, N, NW)	No	No
Wind Channeling	None	None	None
Downwind[2]	No (SE)	No (W)	No (W)
Obstructions and Height	Trees (12 m)	Barn (5 m)	Shipping container (3 m)
Distance from Site to Obstructions	Trees (92 m NW)	Barn (12 m E)	Shipping container (8 m N)
Road/Site Access	No	Yes	No
Electricity Available <18 m	No	Yes	Yes
Pros	☐ Level ground ☐ Space available ☐ Close proximity to source ☐ High SO_2 modeling	☐ Level ground ☐ Power available ☐ Space available ☐ Site access ☐ High SO_2 modeling	☐ Level ground ☐ Power available ☐ Space available ☐ High SO_2 modeling
Cons	☐ Not downwind ☐ No power ☐ Mining activity ☐ No site access ☐ Local obstructions ☐ Property owner declined	☐ Not downwind ☐ Local obstructions ☐ Private hunting lease ☐ Property owner declined	☐ Not downwind ☐ No site access ☐ Potential interference from railroad to the east ☐ Local obstructions ☐ Property owner declined
Viable Site (Yes, No, or Preferred)	No	No	No

Martin Lake Electrical Monitor Placement Evaluation

Site Number	Martin Lake #13	Martin Lake #14	Martin Lake #15
Location[2]	32.25564, -94.61095	32.25757, -94.60898	32.24769, -94.60595
Distance from SO_2 Source[2]	3,820 m	3,640 m	3,560 m
Wind Direction	SSW to SE	SSW to SE	SSW to SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	No	No	No
Wind Channeling	None	None	None
Downwind[2]	No (W)	No (W)	No (W)
Obstructions and Height	None	None	None
Distance from Site to Obstructions	None	None	None
Road/Site Access	No	Yes	No
Electricity Available <18 m	No	Yes	Yes
Pros	☐ Level ground ☐ High SO_2 modeling ☐ Space available	☐ Level ground ☐ Power available ☐ Space available ☐ Site access ☐ High SO_2 modeling ☐ Property owner amenable	☐ Level ground ☐ Power available ☐ Space available ☐ High SO_2 modeling
Cons	☐ Not downwind ☐ No power ☐ No site access ☐ Property owner declined	☐ Not downwind	☐ Not downwind ☐ No site access ☐ Heavy vehicle traffic ☐ Property owner declined
Viable Site (Yes, No, or Preferred)	No	Yes	No

Martin Lake Electrical Monitor Placement Evaluation

Site Number	Martin Lake #16	Martin Lake #17	Martin Lake #18
Location[2]	32.24522, -94.60680	32.25787, -94.60089	32.25731, -94.59395
Distance from SO_2 Source[2]	3,760 m	2,870 m	2,240 m
Wind Direction	SSW to SE	SSW to SE	SSW to SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	Yes; lake (S)	No	Yes; retention pond (E)
Wind Channeling	None	None	None
Downwind[2]	No (W)	No (W)	No (W)
Obstructions and Height	None	Trees (10 m)	Trees (10 m)
Distance from Site to Obstructions	None	Trees (16 m W)	Trees (16 m W, N, S)
Road/Site Access	No	No	Yes
Electricity Available <18 m	No	Yes	Yes
Pros	☐ Level ground ☐ Space available ☐ High SO_2 modeling	☐ Level ground ☐ Power available ☐ Space available ☐ High SO_2 modeling	☐ Level ground ☐ Power available ☐ Space available ☐ Site access ☐ High SO_2 modeling
Cons	☐ Not downwind ☐ No power ☐ No site access ☐ Heavy vehicle traffic ☐ Property owner declined	☐ Not downwind ☐ No site access ☐ Local obstructions ☐ Unresponsive property owner	☐ Not downwind ☐ Local obstructions ☐ Unresponsive property owner
Viable Site (Yes, No, or Preferred)	No	No	No

Martin Lake Electrical Monitor Placement Evaluation

Site Number	Martin Lake #19	Martin Lake #20
Location[2]	32.28167, -94.52449	32.27272, -94.53505
Distance from SO_2 Source[2]	5,630 m	4,360 m
Wind Direction	SSW to SE	SSW to SE
Grade	<1%	<1%
Flood Plains	No	No
Mountain/Valley Winds	None	None
Water Body Within 1,000 m	No	Yes; lake (SW)
Wind Channeling	None	None
Downwind[2]	No (ENE)	No (ENE)
Obstructions and Height	None	None
Distance from Site to Obstructions	None	None
Road/Site Access	Yes	Yes
Electricity Available <18 m	Yes	No
Pros	❑ Level ground ❑ Power available ❑ Space available ❑ Site access ❑ High SO_2 modeling	❑ Level ground ❑ Space available ❑ Site access ❑ High SO_2 modeling
Cons	❑ Not downwind ❑ Unresponsive property owner	❑ Not downwind ❑ No power ❑ Private hunting lease ❑ Property owner declined
Viable Site (Yes, No, or Preferred)	No	No

[1]Based on 40 Code of Federal Regulations Part 58 and *SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document*
[2]Based on Google Earth
E – east
m – meter
N – north
NE – northeast
NNE – north-northeast
ENE – east-northeast
NNW – north-northwest
NW – northwest
S – south
SE – southeast
SO_2 – sulfur dioxide
SW – southwest
SSW – south-southwest
W – west
> – greater than
< – less than
– number
% – percent

Martin Lake Electrical Monitor Placement Evaluation

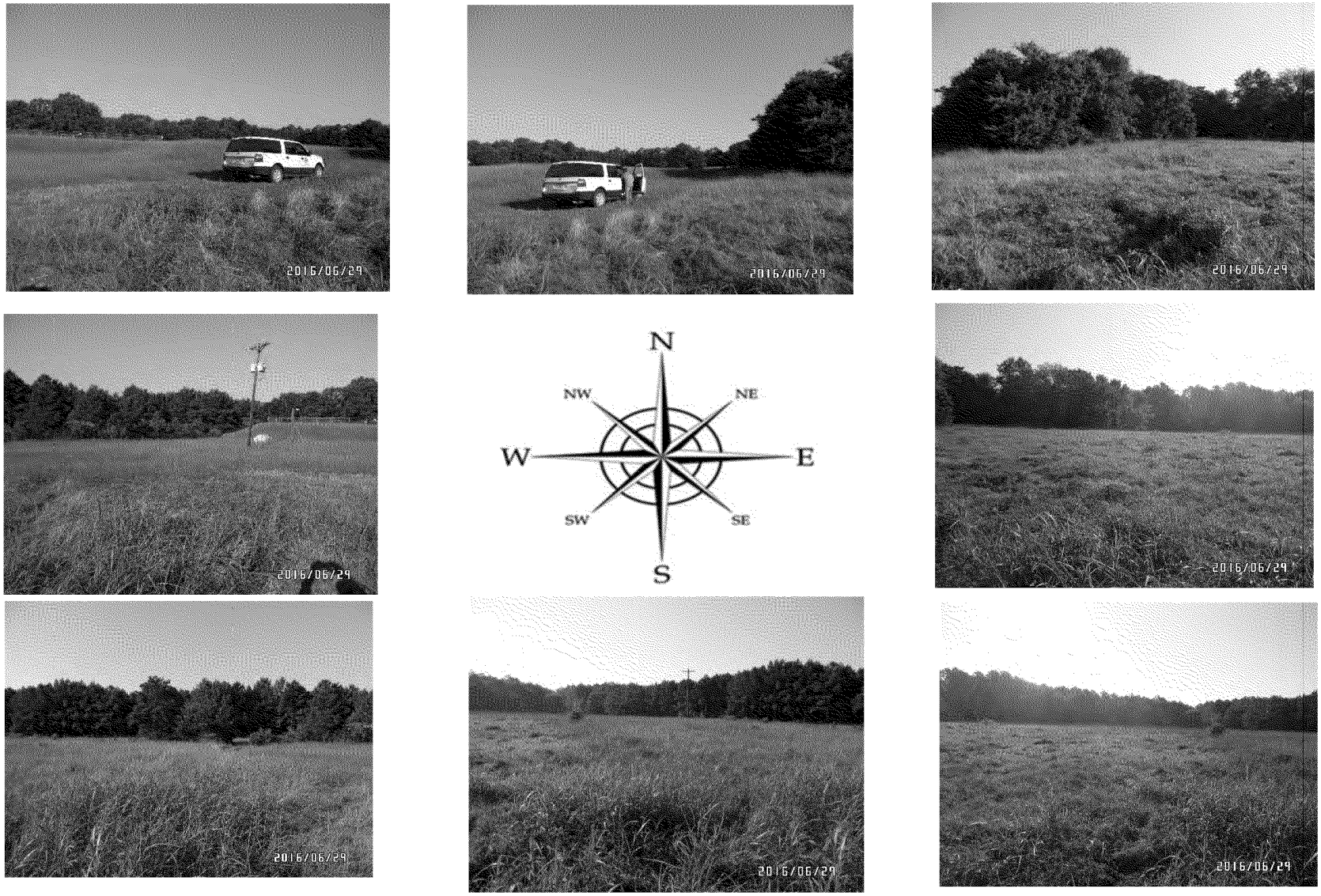


Figure 7: Martin Lake Potential Site #1 Cardinal Direction Photos

Figure 8: Martin Lake Potential Sites #1 Satellite Images

References

Griffith, G. E., S. A. Bryce, J. M. Omernik, J. A. Comstock, A. C. Rogers, B. Harrison, S. L. Hatch, and D. Bezanson. *Ecoregions of Texas*. (2 sided color poster with map, descriptive text, summary tables, and photographs). Reston, Virginia: U.S. Geological Survey, 2004. Scale 1:2,500,000.

"IEM : Site Locator." Iowa Environmental Mesonet. 2016. Accessed April 06, 2016. https://mesonet.agron.iastate.edu/sites/locate.php?network=TX_ASOS

U.S. EPA. EPA Docket ID: EPA-HQ-OAR-2014-0464. *Texas Technical Support Document – Area Designations for the 2010 SO_2 Primary National Ambient Air Quality Standard (EPA-HQ-OAR-2014-0464-0144)*. pp. 145-162. 2016. Accessed October 3, 2016. https://www.regulations.gov/docket?D=EPA-HQ-OAR-2014-0464.

Exhibit D

Monticello Monitor Placement Evaluation

Source Information

- Name: Monticello Steam Electric Station (Monticello) (Figure 2)
- Owner: Luminant Generation Company, LLC
- Facility function: electric generation
- Location: 33.09132, -95.03759, Texas Commission on Environmental Quality (TCEQ) Region 5, Titus County, Texas
- Sulfur dioxide (SO_2) emissions data: 24,399 tons (2013), 20,515 tons (2014)
- Long-term emissions trend: decreasing, 65 percent (%) decrease from 2010 to 2014
- Emission profile: operational seasonally (from May–September, annually), permitted to operate year-round
- Stack height(s): three stacks, S-1 and S-2 – 122 meters (m) high, S-3 – 140 m high, each currently active
- SO_2 emission controls: miscellaneous control methods
- Permit related data: Federal Operating Permit number 064

Existing Air Monitoring Sites

The TCEQ operates five ambient air monitoring sites within a 100 kilometer (km) radius of Monticello. Table 1 details the five closest monitoring sites in order of proximity. Maximum SO_2 ground level concentrations can be expected close to the source. Although one location currently monitors SO_2, none of the existing sites are within reasonable proximity to the source to characterize maximum SO_2 concentrations.

Table 1: Air Monitoring Sites Near Monticello

Site	Distance from Monticello	Current Sulfur Dioxide (SO_2) Monitoring	SO_2 Design Value (2013–2015)
Tyler Airport Relocated	90 km southwest	No	Not applicable
Karnack	94 km southeast	No	Not applicable
Texarkana	97 km northeast	No	Not applicable
Longview	100 km southeast	Yes	46 parts per billion
Greenville	100 km west	No	Not Applicable

km – kilometer

Monticello Monitor Placement Evaluation

Settings and Surroundings

The primarily rural area surrounding Monticello is located in the eastern most portion of the Floodplains and Low Terraces ecoregions of the East Central Texas Plains. This area is characterized by a mix of dense hardwood forests of oak, ash, pecan, and cedar elm, as well as cleared pastures (Griffith et al. 2004). The elevation ranges from 91 m to 142 m, as shown in Figure 1. No significant changes to the landscape were noted during the reconnaissance as compared to the satellite image shown in Figure 6. Thick elevated vegetation is a factor that may affect wind patterns across this area. Mountain and valley wind channeling, and other terrain related meteorological impacts, are not expected in this area.

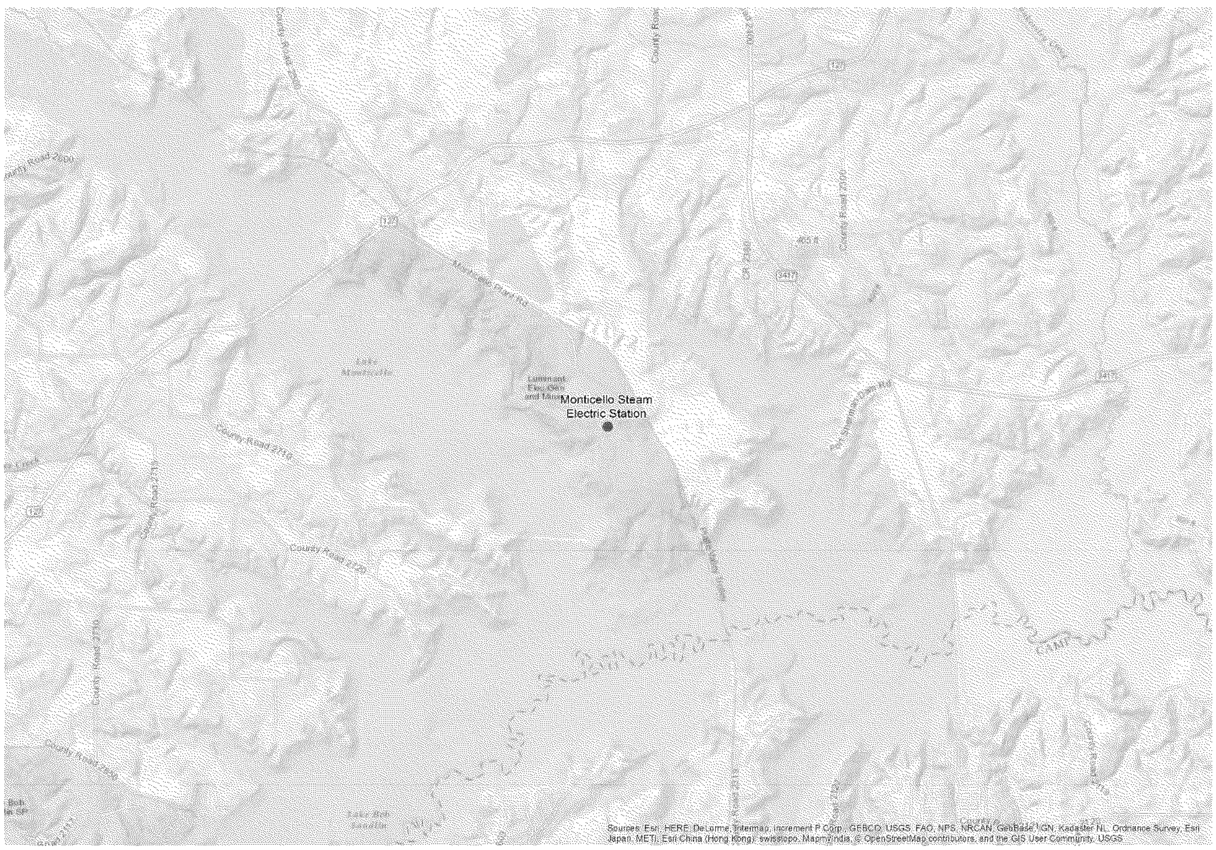


Figure 1: Monticello Area Elevation Map

Monticello Monitor Placement Evaluation

Figure 2: Monticello Sulfur Dioxide (SO_2) Stacks and Emissions, 2013

TPY – tons per year

Monticello Monitor Placement Evaluation

Meteorological Data

Figure 3 provides illustrations of area annual average wind speed and direction for 2012, 2013, and 2014 from meteorological sensors at the Mount Pleasant Airport, located 7 km east of Monticello. Figure 4 illustrates the 2012-2014 annual average wind speed. The length of each wind rose bar corresponds to the frequency of the wind coming from the indicated direction by percentage. Based on the analysis of the 2012-2014 wind data, the dominant wind flow direction for the area is 105 degrees southeast to 190 degrees south. Approximately 32% of the average area wind flows move from these directions. Over this three year period, calm winds (0-2 miles per hour) occurred on average 26.7% of the time, and wind speeds averaged 5.8 miles per hour (Iowa Environmental Mesonet 2016).

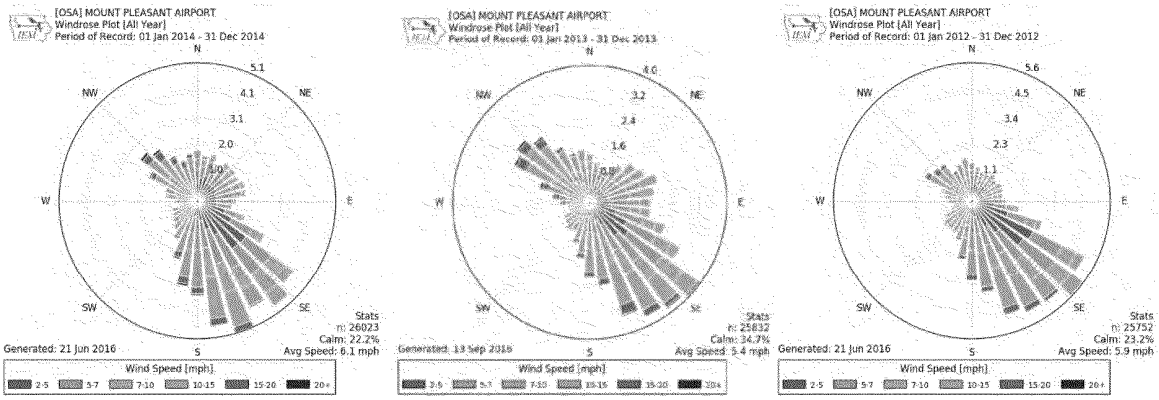


Figure 3: (From right to left) 2012, 2013, and 2014 Individual Wind Rose Plots

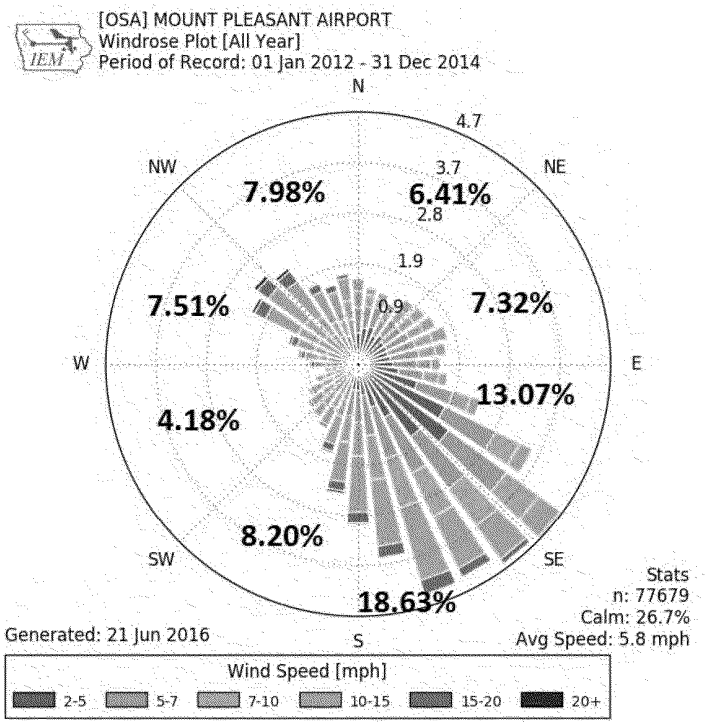


Figure 4: 2012-2014 Combined Average Wind Rose Plot

Monticello Monitor Placement Evaluation

Modeling Analysis for Monitoring Site Placement

The *SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document* (Monitoring TAD) suggests that modeling is one technique that may be used to assist in identifying potential monitoring sites. The *SO_2 NAAQS Designations Modeling Technical Assistance Document* (Modeling TAD) notes that for area designations under the 2010 SO_2 National Ambient Air Quality Standard (NAAQS), the AERMOD modeling system should be used, unless use of an alternative model can be justified.

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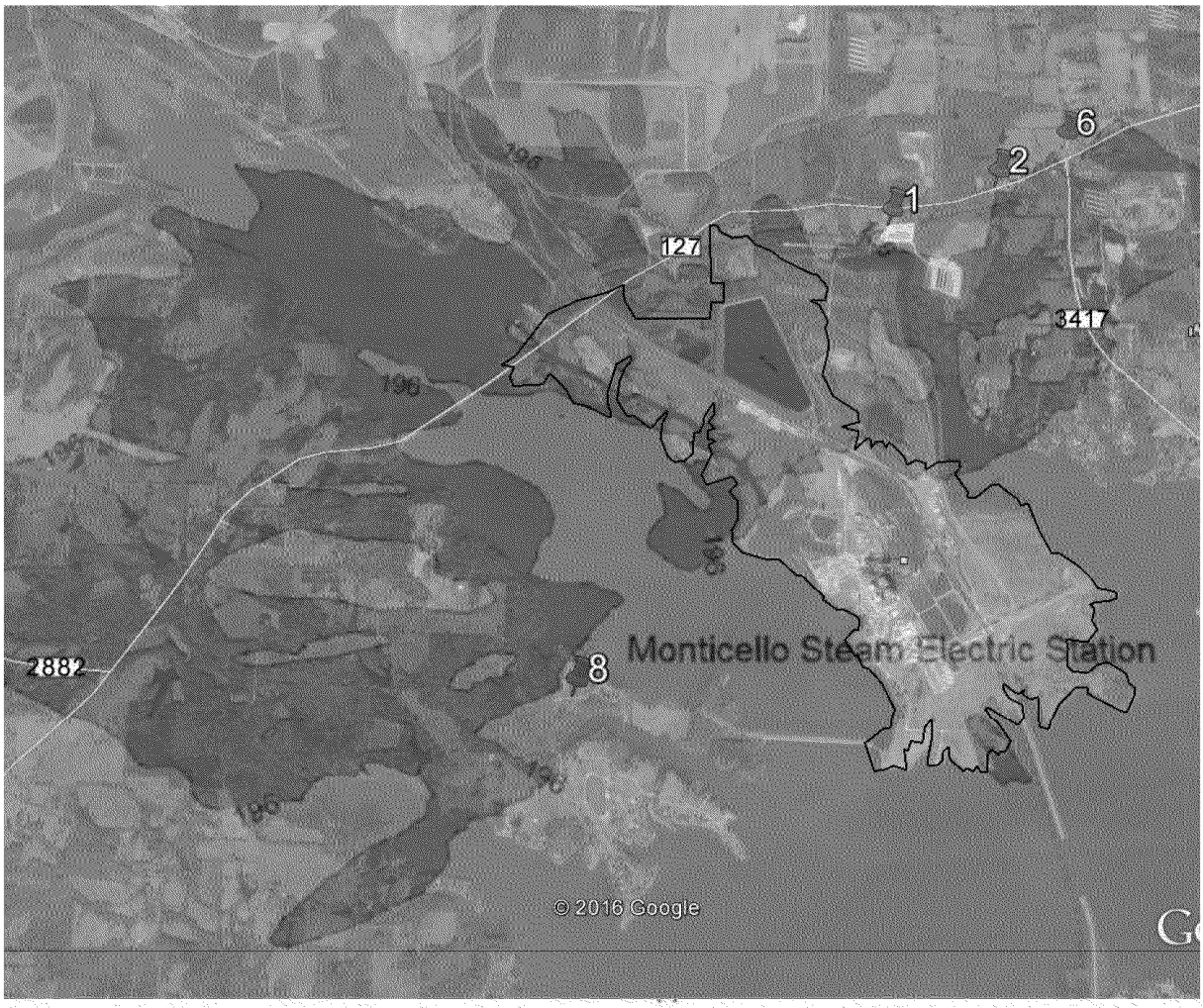
Monticello Monitor Placement Evaluation



1-hour average SO2 concentrations (ug per cubic meter) - All colored areas exceed the NAAQS.

196 225

SO_2 – sulfur dioxide
ug – micrograms
NAAQS – National Ambient Air Quality Standards

Scale
(red) – 196–225 micrograms per cubic meter (ug/m^3) average SO_2 concentrations
(yellow) – greater than 225 ug/m^3 average SO_2 concentrations

Figure 5: Sierra Club's Modeled Impacts using Actual Emissions from 2012–2014 for the Monticello Analysis Area

Monticello Monitor Placement Evaluation

Siting Options and Criteria

The TCEQ does not have SO_2 monitors located in the area surrounding Monticello that would be expected to characterize the highest SO_2 concentrations from this facility, therefore, a new site is proposed. The TCEQ focused on complying with the federal requirements listed in 40 Code of Federal Regulations (CFR) Part 58, Appendix E regarding siting criteria. In addition, the TCEQ evaluated areas for a monitoring site location that would appropriately and sufficiently characterize air quality around an SO_2 emissions source. This approach included utilizing multiple techniques and guidance provided in the Monitoring TAD, such as modeling, local wind roses that reflect data from 2012-2014, and area site reconnaissance.

The modeling analysis provided in Figure 5 suggests that off-property maximum SO_2 concentrations are expected to occur north, north northeast, and northwest of the Monticello facility, with isolated pockets of higher and lower concentrations. In addition, the highest predicted model concentration of SO_2 based on actual emissions from the facility is expected directly north northeast of Monticello (e.g., the highest predicted value occurred approximately 1.5 km to the north northeast of the facility center). While the modeling analysis referenced in this report relied on the wind data from the Longview, Texas Regional Airport, 84 km from the Monticello Plant, the TCEQ's reconnaissance and siting analysis used wind data from the Mount Pleasant Airport, 7 km from the plant (see Figures 3 and 4).

Many areas with anticipated high SO_2 concentrations are not viable for monitoring site deployment due to a lack of power, dense vegetation, or averse property owners. Twelve potential monitoring sites were identified in other areas, as shown in Figure 6. Figure 6 depicts the potential site locations (red and green pins), the corresponding property lines (yellow), and the Monticello permitted property line (black). Eight of the twelve sites (3, 4, 5, 7, 9, 10, 11, and 12) are not considered viable and are indicated by red pins. Upon first contact, property owners at sites 3, 4, 5, 7, 9, 10, 11, and 12 (red pins) either refused access, or the property was unsuitable. The property owner at site 3 declined monitor placement due to its proximity to the rail line. Site 4 has uneven terrain and lacks electricity. Site 5 is heavily industrial. Sites 7, 8, and 9 lack electricity. Site 9 is not accessible, is inside the permitted property, and has uneven ground. Sites 10 and 12 are heavily wooded with dense vegetation. Site 11 is a landfill with no power.

The four identified potential sites (1, 2, 6, and 8) indicated with green pins in Figure 6 are considered viable and meet logistical and siting criteria.

- Site 1 is located 2.54 km north of the Monticello facility in an area anticipated to potentially experience elevated SO_2 concentrations (indicated by a green pin in Figure 6). This site is downwind of the source when winds are from the south, 26.9% of the year on average (see Figure 4). The site offers level ground, adequate space, available power, and is easily accessible (see section "Recommendation" and Table 2). The property owner is amenable to a site agreement.
- Site 2 is positioned 2.95 km north northeast of the Monticello facility and is located in an area anticipated to potentially experience elevated SO_2 concentrations (indicated by a green pin in Figure 6). This site is downwind of the source when winds are from the southwest, 14.4% of the year on average (see Figure 4). The site offers level ground, adequate space, and is easily accessible (see section "Recommendation" and Table 2). The property owner is amenable to a site agreement.

Monticello Monitor Placement Evaluation

- Site 6 is positioned 3.24 km north northeast of the Monticello facility and is located in an area anticipated to potentially experience elevated SO_2 concentrations (indicated by a green pin in Figure 6). This site is downwind of the source when winds are from the southwest, 14.4% of the year on average (see Figure 4). The site offers level ground, adequate space, available power, and is easily accessible (see section "Recommendation" and Table 2). The property owner is amenable to a site agreement.
- Site 8 is positioned 2.43 km southwest of the Monticello facility and is located in an area anticipated to potentially experience elevated SO_2 concentrations (indicated by a green pin in Figure 6). This site is downwind of the source when winds are from the east, 8.08% of the year on average (see Figure 4). The site offers level ground, adequate space, available power, and is easily accessible (see section "Recommendation" and Table 2). The property owner is amenable to a site agreement.

Recommendation

Pursuant to 40 CFR Sections 51.1201 and 51.1203, the TCEQ recommends an air monitoring station in the area near Monticello to collect and submit air quality data characterizing potential maximum 1-hour ambient concentrations of SO_2 in the area. According to the regulations, the level of the national primary 1-hour annual ambient air quality standard for SO_2 shall be measured at an ambient air monitoring site using a Federal Reference Method (FRM) or a Federal Equivalent Method (FEM) (40 CFR Part 50.17(c)). The TCEQ is proposing to deploy an air monitoring station to characterize SO_2 levels in the area utilizing an automated equivalent method, which is considered an FEM (40 CFR Part 53).

Based on current facility operations, available emission data, wind patterns, logistics, and modeling analyses, Site 1 (Figures 5 and 6) is the recommended location for placement of a new source-oriented ambient SO_2 monitoring station. The most influential factors constraining site placement for Monticello were averse property owners and logistics (e.g., property access and siting criteria). Property owners in areas where modeling predicted the highest concentrations (sites 3, 9, 10, 11 and 12) all declined to negotiate site agreements. Additional locations were considered based on wind rose data but were either logistically unsuitable or declined by property owners (sites 4, 5, and 7).

Historical meteorological data from 2012-2014 (Figure 4) show the area around site 1 is downwind of Monticello during southerly winds, on average 26.9% of the year. Site 1 is the closest viable location to the source (2.54 km) and the predicted off-property maximum normalized SO_2 concentrations with available power, adequate space, and level ground that meets all federal siting criteria. The property owner is amenable to a site agreement.

Monticello Monitor Placement Evaluation

Figure 6: Potential Monticello Area Monitoring Sites

Monticello Monitor Placement Evaluation

Table 2: Potential Sites Assessment[1]

Site Number	Monticello #1	Monticello #2	Monticello #3
Location[2]	33.11425, -95.03701	33.11688, -95.02874	33.11030, -95.06006
Distance from SO_2 Source[2]	2,544 m	2,952 m	2,970 m
Wind Direction	S, SE	S, SE	S, SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	Yes; lake (S)	None	Yes; lake (W, SW, S)
Wind Channeling	None	None	None
Downwind[2]	Yes (N)	Yes (NNE)	Yes (NW)
Obstructions and Height	Trees (30 m), Structure (9 m)	Trees (7 m)	Bush (3 m), Trailer (3 m)
Distance from Site to Obstructions	Trees (258 m S) Structure (42 m S)	Trees (65 m N, 64 m NE, 21 m E, 33 m S, 28 m W)	Bush (20 m N) Trailer (15 m W)
Road/Site Access	Yes	Yes	Yes
Electricity Available <18 m	Yes	Yes	Yes
Pros	• Downwind • Level ground • Power available • Space available • High SO_2 modeling • Agreeable property owner • Site access • Close proximity to facility	• Downwind • Level ground • Power available • Space available • High SO_2 modeling • Site access • Agreeable property owner	• Downwind • Level ground • Power available • Space available • High SO_2 modeling • Site access • Close proximity to facility
Cons			• Property owner declined
Viable Site (Yes, No, or Preferred)	Preferred	Yes	No

Monticello Monitor Placement Evaluation

Site Number	Monticello #4	Monticello #5	Monticello #6
Location[2]	33.11387, -95.01232	33.11128, -95.02306	33.11950, -95.02337
Distance from SO_2 Source[2]	3,520 m	2,640 m	3,440 m
Wind Direction	S, SE	S, SE	S, SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	None	None	None
Wind Channeling	None	None	None
Downwind[2]	Yes (NE)	Yes (NNE)	Yes (NNE)
Obstructions and Height	Trees (10 m)	Trees (6 m)	Fence (1 m)
Distance from Site to Obstructions	Trees (32 m N, 61 m SE)	Trees (15 m SE)	Fence (1 m SE, SW)
Road/Site Access	Yes	Yes	Yes
Electricity Available <18 m	Yes	Yes	Yes
Pros	• Downwind • Space available • High SO_2 modeling • Site access	• Downwind • Level ground • Power available • High SO_2 modeling	• Downwind • Level ground • Power available • Space available • Agreeable property owner • Site access
Cons	• Power available at a distance • Unleveled ground • Water main under property • Property owner declined	• No space available • Heavy industry • Property owner declined • No site access	• Low SO_2 modeling
Viable Site (Yes, No, or Preferred)	No	No	Yes

Monticello Monitor Placement Evaluation

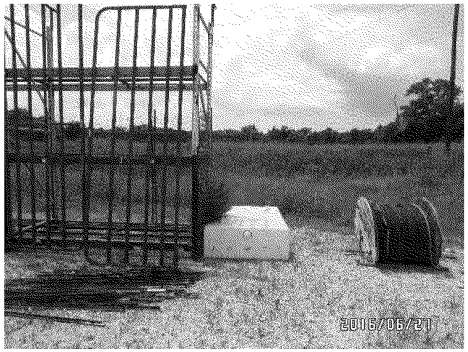
Site Number	Monticello #7	Monticello #8	Monticello #9
Location[2]	33.08961, -95.01497	33.08441, -95.06082	33.10517, -95.05396
Distance from SO_2 Source[2]	2,121 m	2,297 m	2,168 m
Wind Direction	S, SE	S, SE	S, SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	Yes; lake (N, E, S, W)	Yes; lake (N, E, SE)	Yes; lake (SW)
Wind Channeling	None	None	None
Downwind[2]	No (E)	No (W)	Yes (NW)
Obstructions and Height	None	Trees (12 m)	None
Distance from Site to Obstructions	None	Trees (70 m SE, 81 m S)	None
Road/Site Access	Yes	Yes	Yes
Electricity Available <18 m	Yes	Yes	Yes
Pros	• Level ground • Space available • Site access • Close proximity to facility	• Level ground • Space available • Site access • Agreeable property owner	• Downwind • Level ground • Space available • High SO_2 modeling
Cons	• Not downwind • Power available at a distance • Low SO_2 modeling • Property owner declined	• Not downwind • Power available at a distance • Low SO_2 modeling	• Power available at a distance • No site access • Property owner declined • Site within permitted property
Viable Site (Yes, No, or Preferred)	No	Yes	No

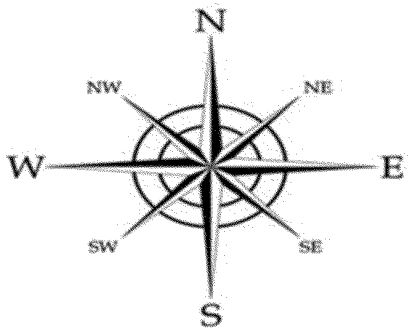
Monticello Monitor Placement Evaluation

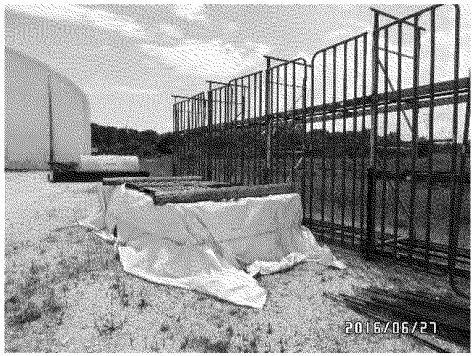
Site Number	Monticello #10	Monticello #11	Monticello #12
Location[2]	33.11039, -95.05194	33.10321, -95.03708	33.11194, -95.06110
Distance from SO_2 Source[2]	2,505 m	1,323 m	3,171 m
Wind Direction	S, SE	S, SE	S, SE
Grade	<1%	<1%	<1%
Flood Plains	No	No	No
Mountain/Valley Winds	None	None	None
Water Body Within 1,000 m	Yes; lake (S)	Yes; lake (E)	Yes; lake (W)
Wind Channeling	None	None	None
Downwind[2]	Yes (NW)	Yes (N)	Yes (NW)
Obstructions and Height	Trees (12 m)	None	None
Distance from Site to Obstructions	Trees (15 m W, 13 m N, 50 m SW)	None	None
Road/Site Access	Yes	No	No
Electricity Available <18 m	Yes	No	No
Pros	• Downwind • Level ground • Power available • High SO_2 modeling • Close proximity to facility	• Downwind • Level ground • Space available • High SO_2 modeling • Close proximity to facility	• Downwind • Level ground • High SO_2 modeling • Close proximity to facility
Cons	• Heavily wooded area • Property owner declined • No site access	• No power • No site access • Located on landfill site • Property owner declined	• No power • No site access • Heavily wooded area • Property owner declined • No site access
Viable Site (Yes, No, or Preferred)	No	No	No

[1]Based on 40 Code of Federal Regulations Part 58 and *SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document*
[2]Based on Google Earth
E – east
m – meter
N – north
NA – not applicable
NE – northeast
NNE – north northeast
NW – northwest
S – south
SE – southeast
SO_2 – sulfur dioxide
SW – southwest
W – west
> – greater than
< – less than
– number
% – percent

Monticello Monitor Placement Evaluation







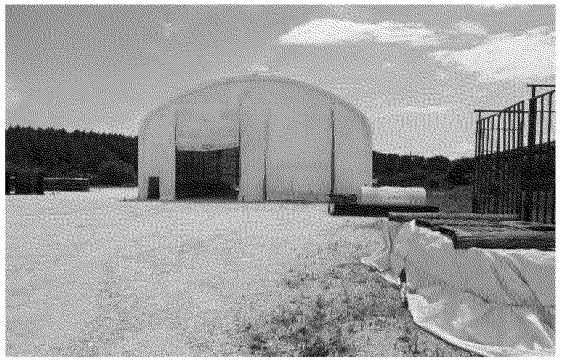


Figure 7: Monticello Potential Site #1 Cardinal Direction Photos

Monticello Monitor Placement Evaluation

Figure 8: Monticello Potential Site #1 Satellite Image

References

Griffith, G. E., S. A. Bryce, J. M. Omernik, J. A. Comstock, A. C. Rogers, B. Harrison, S. L. Hatch, and D. Bezanson. *Ecoregions of Texas*. (2 sided color poster with map, descriptive text, summary tables, and photographs). Reston, Virginia: U.S. Geological Survey, 2004. Scale 1:2,500,000.

"IEM : Site Locator." Iowa Environmental Mesonet. 2016. Accessed April 06, 2016. https://mesonet.agron.iastate.edu/sites/locate.php?network=TX_ASOS.

U.S. EPA. EPA Docket ID: EPA-HQ-OAR-2014-0464. *Texas Technical Support Document – Area Designations for the 2010 SO_2 Primary National Ambient Air Quality Standard (EPA-HQ-OAR-2014-0464-0144)*. pp. 163-181. 2016. Accessed September 22, 2016. https://www.regulations.gov/docket?D=EPA-HQ-OAR-2014-0464.

To: Dunham, Sarah[Dunham.Sarah@epa.gov]
From: Lewis, Josh
Sent: Thur 2/2/2017 2:54:58 PM
Subject: updated chart
Table.020217 version.xlsx

To: ARA[ARA@epa.gov]; OARM-OA-SSD-OARMDIR[OARMOASSDOARMDIR@epa.gov]; OARM-OA-SSD-ORD-NLD[OARMOASSDORDNLD@epa.gov]; Battaglia, Amy[Battaglia.Amy@epa.gov]; Page, Steve[Page.Steve@epa.gov]; Grundler, Christopher[grundler.christopher@epa.gov]; Flynn, Mike[Flynn.Mike@epa.gov]; Barnet, Henry[Barnet.Henry@epa.gov]; Housenger, Jack[Housenger.Jack@epa.gov]; Simon, Nigel[Simon.Nigel@epa.gov]; Cheatham, Reggie[cheatham.reggie@epa.gov]; Best-Wong, Benita[Best-Wong.Benita@epa.gov]; Johnston, Khanna[Johnston.Khanna@epa.gov]; OARM-OA-SSD-RST-DD[OARMOASSDRSTDD@epa.gov]
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From: Director of SSD
Sent: Mon 1/23/2017 8:22:45 PM
Subject: EPA's Calendar Year 2016 Occupational Safety and Health Questionnaire
CY 2016 OSH Questionnaire-Final.docx
CY16 OSH POCs_FINAL.docx

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January 23, 2017

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MEMORANDUM

SUBJECT: EPA's Calendar Year 2016 Occupational Safety and Health Questionnaire

FROM: David Gibson, Director /s/

Safety and Sustainability Division

TO: Assistant Regional Administrators

Directors, Office of Administration and Resources Management

Office of Research and Development National Laboratory Directors

Director, Office of Program Accountability and Resource Management

Director, Office of Air Quality Planning and Standards

Director, Office of Transportation and Air Quality

Director, Office of Radiation and Indoor Air

Director, Office of Criminal Enforcement, Forensics and Training

Director, Office of Pesticides Programs

Director, Office of Program Management

Director, Office of Emergency Management

Director, Office of Wetlands, Oceans and Watersheds

Director, Office of Regional Operations

Regional Science and Technology Division Directors

Section 19(a)(5) of the Occupational Safety and Health Act requires federal agencies to submit an annual OSH report to the Department of Labor that describes what they are doing to provide their employees with safe and healthful work conditions. The SSD has prepared a questionnaire that will be used to gather the information needed to compile the EPA's CY 2016 report. The SSD will also use this information to validate the agency's CY 2016 OSH priorities and identify guidance, training, or other support that EPA locations may require. As in past years, the SSD will also generate OSH mini reports, which will be presented and discussed with local management, to show how each EPA location is performing relative to the agency as a whole,

The deadline for completing and submitting the CY 2016 OSH questionnaire is **February 17, 2017; we encourage earlier submittals, if possible.** I am attaching a list that identifies a point of contact for each EPA reporting location. Please review it and contact Jamar Jackson at (202) 564-7652 immediately if the POC is not the person who will be completing the questionnaire for your location.

To reduce administrative burden, the SSD will pre-populate many of the questions with responses that EPA locations provided last year. We will send a customized pre-populated questionnaire to each EPA location's POC within the next few days. Respondents will be able to modify their pre-populated data and enter new information directly into that file. Completed questionnaires should be emailed directly to Jamar Jackson. As in past years, senior managers (or their designees) will be asked to review and approve the completed questionnaires for their locations. I am attaching a blank (**non pre-populated**) version of the CY 2016 questionnaire, so that you can view the questions ahead of time.

Thank you in advance for your assistance in responding to this data request. If you have questions, please contact Jamar Jackson at (202) 564-7652.

Attachments

cc: Vaughn Noga

Maryann Petrole

- Steve Blankenship
- Alva Daniels
- Tim Watkins

ORD Division Directors

Lee Cook

Stephen Page

Kay Holt

Greg Carroll

Harry Compton

- John Griggs
- Ed Wilds

Jack Housenger

- Susan Lawrence
- Minh-Thuy Nguyen
- Yvette Jackson
- David Wright
- Amy Caldwell

Jamar Jackson

OSH Questionnaire Contacts

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Cc: Cook, Leila[cook.leila@epa.gov]
From: Hengst, Benjamin
Sent: Mon 2/6/2017 8:35:06 PM
Subject: FW: ICYMI-- trade press article on Phase 2 HD litigation

fyi

From: Orlin, David
Sent: Monday, February 06, 2017 3:32 PM
To: Charmley, William <charmley.william@epa.gov>; Moulis, Charles <moulis.charles@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Sutton, Tia <sutton.tia@epa.gov>
Cc: Kataoka, Mark <Kataoka.Mark@epa.gov>
Subject: ICYMI-- trade press article on Phase 2 HD litigation

Below is an article from Inside EPA on the litigation on the HD rule. Has some interesting quotes from industry sources (e.g., suggesting that they expect EPA to settle with TTMA and that the OEMs might object if EPA does not then adjust the standards to reflect the CO2 reductions being foregone). Also mentions the Racing challenge and Chris' talk to SAE.

Trailer Makers Detail Narrow Challenge To EPA Heavy-Duty Truck GHG Rule

February 06, 2017

The Truck Trailer Manufacturers Association (TTMA) says it plans to challenge only the trailer-related provisions of EPA's phase two medium- and heavy-duty truck greenhouse gas rule finalized last year, rather than pursue a broad challenge to the overall rule.

The group outlines the scope of its challenge in a Feb. 2 filing responding to Jan. 23 motions by eight states and environmental groups to intervene on EPA's behalf and defend the rule. That effort appeared to be aimed at defending the trailer provisions in the event the Trump administration declines to do so, though it could also be an attempt to preserve the overall stringency of the rule if the trailer portion is removed. The court has not yet ruled on the intervenor motions.

One industry source says groups that back the rule's engine and vehicle provisions do not intend to become involved in the litigation and expect the new administration and TTMA to reach a settlement. However, that participation plan could change if the stringency of the heavy-duty truck portion of the rule is not softened to account for whatever may be lost from trailers.

TTMA says in the filing that it is not taking a position on the effort to intervene while noting it "challenges only the provisions that pertain to trailers, and trailers do not have engines." The filing notes that the challenged provisions require trailers hauled by heavy-duty tractors to have aerodynamic additions that, the group says, will achieve little if any GHG or fuel economy benefit because the added weight of the equipment would require loads to be lighter and result in the need for additional trucks to transport the same amount of goods.

"Accordingly, Movants may have no interest in, or suffer injury from, TTMA's challenge to the trailer requirements, and they have not articulated any such injury," the filing says.

One TTMA source says that the group is not concerned that separate, already-existing rules in California regulating trailers will impose two different standards because the California rule requires "the fleet to buy the equipment needed to comply and not . . . the trailer manufacturers to sell unneeded equipment."

The source adds that the group will argue that EPA lacks Clean Air Act authority to regulate trailers as a "motor vehicle" -- a longstanding claim that the Obama EPA rejected, through the Trump EPA has not weighed in on the matter.

Racing Challenge

Joining TTMA in the Dec. 28 challenge to the EPA rule is the Racing Enthusiasts & Suppliers Coalition, a group that is expected to argue that EPA's removal of language from a draft version of the rule -- which critics warned could affect amateur racers -- did not go far enough to satisfy their concerns.

Offering support to this group is Sen. Richard Burr (R-NC), who introduced Jan. 24 legislation, S. 203, to "stop EPA from cracking down on amateur race car mechanics and hobbyists." Rep. Patrick McHenry (R-NC) Jan. 6 introduced a companion version in the House, H.R. 350.

Burr's office said in a statement: "In 2015, for the first time ever, the Obama administration proposed a rule that would have enabled the EPA to fine amateur motorsports enthusiasts for converting their personal vehicles to racecars. This proposal ran counter to nearly a half century of clear congressional intent under the Clean Air Act. Thankfully, the rulemaking was removed; however, the EPA still views the practice of concerting vehicles into racecars as unlawful. The RPM Act will ensure that no administration will ever be able to overstep its regulatory powers in this area."

Lawyers representing the racing group did not respond to repeated requests for comment, so the exact scope of its challenge remains unclear. They have a Feb. 22 deadline to submit a statement of issues.

EPA last April announced that it removed the provision in the then-proposed truck rule that addressed "tampering" with vehicles and had outraged the racing enthusiasts. In a statement posted to its website, the agency said it "supports motorsports and its contributions to the American economy and communities all across the country. EPA's focus is not on vehicles built or used exclusively for racing, but on companies that don't play by the rules and that make and sell products that disable pollution controls on motor vehicles used on public roads." But nonetheless, EPA said it "has decided to eliminate the proposed language from the final rule."

The issue arose at a March 15 hearing where the Specialty Equipment Market Association raised concerns about the provision and threatened to sue EPA over it, though it did not join the litigation. EPA in a notice of data availability last year sought comment on those objections.

In response to EPA's April 15 announcement that it removed the provision, Republican Reps. Fred Upton (MI); Ed Whitfield (KY), who is now retired; and Richard Hudson (NC) said, "EPA slammed the brakes on their gambit to regulate auto racing. EPA had no business using Heavy Duty Truck rules to sideline racecars."

The industry source familiar with the rule says the racing group pursuing the litigation is an "obscure association" that does not believe EPA's fix went far enough.

The source notes that neither the racing challenge nor the trailer petition would revoke the major part of the rule, which is GHG limits from engines and vehicles. However, the source notes that if the trailer provisions are scrapped in litigation or a settlement, "the rule would become

automatically less stringent. Or . . . if you keep the overall standards in place you have to [find] those reductions somewhere else on the truck." That likely would result in the loss of widespread industry support, the source says.

The source expects EPA and TTMA to cut a deal that would give trailers more time to comply with the requirement, rather than gut the requirement entirely, though the outlines of any deal are not clear.

The source says despite the fact that the rule is largely considered to be safe from a congressional effort to revoke it, industry will actively seek to prevent the Trump EPA from gutting the rule through some "creative reachback."

Recent Meeting

Additionally, the source notes that EPA officials, including Office of Transportation & Air Quality Director Chris Grundler, were discussing the agency's light-duty vehicle and truck GHG rules at a Society of Automotive Engineering (SAE) meeting in Washington, D.C., late last month.

The source says the EPA officials gave no indication that their rules may be weakened. This was a surprise, especially for the light-duty rule given last-minute maneuvering by the Obama EPA to short circuit a mid-term review of the rule. Automakers are expected to seek weaker targets through model year 2025, the source says.

The presentations were also a surprise, according to this source, because EPA officials were said to be under a temporary gag order from the Trump administration that is intended to tweak the communication message to reflect the new administration's views.

But Grundler and others agency officials at the closed-door SAE meeting were acting like nothing had changed, the source says, adding that automakers such as Mazda, General Motors and Chrysler all gave presentations suggesting that EPA's mid-term review determination to maintain the standards was wrong.

The source was expecting the "Trump police to walk in and take [the EPA officials] away," based on their defense of the Obama rules. "It was all polite. But there are clear differences of opinion and the industry guys were saying they look forward to working with the new administration."

During a public event hosted by SAE, Grundler also largely defended EPA's mission to protect public health, while repeatedly demurring on predictions of specific agency actions. For example, asked by reporters whether or how EPA might jettison the Obama EPA's light-duty vehicle rule determination, he said, "That will be up to the new administrator." -- *Dawn Reeves* (dreeves@iwpnews.com)

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

To: post-arbcombo@listserv.arb.ca.gov[post-arbcombo@listserv.arb.ca.gov]
From: owner-arbcombo@listserv.arb.ca.gov
Sent: Sat 2/4/2017 2:14:02 AM
Subject: arbcombo -- Slides for February 6 Workshop for California Proposal of Phase 2 GHG Regulation and Possible Changes to Tractor Trailer GHG Regulation

The California Air Resources Board (ARB or Board) has posted the presentation and updated agenda for the public workshop on proposed California Phase 2 Greenhouse Gas (GHG) regulation and amendments to ARB's existing Heavy-Duty Vehicle GHG Emission Reduction Regulation (Tractor-Trailer GHG regulation). The presentation and updated agenda, as well as notice, can be accessed at:
https://www.arb.ca.gov/msprog/onroad/caphase2ghg/caphase2ghg.htm.

Please note that the workshop is moved to the Coastal Hearing Room at 1001 I Street Sacramento, California. This workshop will be held at the following time and location:

Date: Monday, February 6, 2017
Time: 9:30 a.m. to 4:30 p.m.
Place: Cal/EPA Headquarters Building, Coastal Hearing Room
1001 I Street,Sacramento, California 95814

The workshop will also be available via webcast for stakeholders unable to attend in person and can be accessed at the following link on the day of the workshop:
https://video.calepa.ca.gov/.

California is in a drought emergency.
Visit www.SaveOurH2O.org for water conservation tips.

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You are subscribed to one of the lists aggregated to make this particular ARB combination listserve broadcast. To UNSUBSCRIBE: Please go to http://www.arb.ca.gov/listserv/listserv.php and enter your email address and click on the button "Display Email Lists." To unsubscribe, please click inside the appropriate box to uncheck it and go to the bottom of the screen to submit your request. You will receive an automatic email message confirming that you have successfully unsubscribed. Also, please read our listserve disclaimer at http://www.arb.ca.gov/listserv/disclaim.htm .

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, visit the Flex Alert website at www.flexalert.org .

==========

To: Sutton, Tia[sutton.tia@epa.gov]; Scoville, Pat[Scoville.Pat@epa.gov]; OTAQ Materials[OTAQMaterials@epa.gov]
Cc: Cook, Leila[cook.leila@epa.gov]; Mylan, Christopher[Mylan.Christopher@epa.gov]
From: Dickinson, David
Sent: Thur 1/5/2017 5:18:15 PM
Subject: TRU Waiver Materials - First Draft of FR Notice for Janet's review
Desk Statement for TRU 12-27-16.doc
TRU Action Memo.pdf
TRU Cover Letter.pdf
2011 TRU Amendments Authorization Decision Document 1-5-17clean.docx
TRU Authorization Action Memo JM to GM 1-5-17.docx

Tia and Pat –

1. As a reminder, the HD GHG waiver is signed by Janet and published in the FR.

2. Janet has the HD in-use compliance waiver for initial review as of yesterday.

3. Attached are materials for the TRU (transport refrigeration units), including the FR Notice (for Janet's initial review) along with a signed cover note from Lee to Janet and a signed Action Memo from Lee to Janet. I believe Lee would like the cover note, and possibly the action memo, to be sent to Janet along with the FR Notice in order to give Janet some context. Also attached is the desk statement (that I previously sent to all yesterday) and an Action Memo draft from Janet to the Administrator.

4. Lee is hoping to review the Commercial Harbor Craft FR Notice today and hopefully we can prepare a similar package for Janet as the TRU package noted above – for sending forward to Janet today.

5. Last, Lee is hoping to review the off-road recreation vehicle FR Notice by early tomorrow and we will prepare a similar package for Janet by tomorrow (well before the 4/4:30 deadline for the weekend book).

Thanks,

David

David Dickinson

202-343-9256

Dickinson.David@epa.gov

U.S. Environmental Protection Agency (EPA)
Calendar Year (CY) 2016
Occupational Safety and Health (OSH) Questionnaire

Section 19(a)(5) of the Occupational Safety and Health Act requires federal agencies to submit an annual report to the Department of Labor (DOL) that describes what they are doing to provide safe and healthful working conditions for their employees. **Please note that the DOL switched to a CY reporting cycle two years ago.** The Safety and Sustainability Division (SSD) needs your help in completing this questionnaire to compile information for the CY 2016 OSH report that will be submitted to the DOL. **The deadline for completing the questionnaire and submitting it to the SSD is February 17, 2017; we encourage earlier submittals, if possible.**

Please enter your responses directly into the data-entry fields that appear throughout this document. For your convenience, the SSD has pre-populated many of the questions with responses that your location provided last year. Please review the pre-populated answers carefully to ensure that they are still accurate – we know circumstances and practices can change. If the responses require modification, select the field you wish to change, delete the answer provided, and type in the correct response. Also, please note that many of the questions ask specifically about CY 2016 activities and have not been pre-populated with past responses.

You can navigate through the questionnaire using the Tab key, which will automatically take you to the next data-entry field. Use the scroll bar on the right-hand side if you wish to move through the pages of the questionnaire more quickly. For answers that require a "yes" or "no," please insert an "X" into the appropriate box to mark your answer. When you are satisfied with your responses, send your completed questionnaire to Jamar Jackson. If you have questions, contact Jamar Jackson [jackson.jamar@epa.gov; (202) 564-7652]. If you have difficulties using the questionnaire, contact our contractor: Chris Hartnett [chris.hartnett@erg.com; (512) 407-1829].

BACKGROUND INFORMATION

1. Which location is covered in this questionnaire? _____
2. Please list the organizations (e.g., program offices) and buildings covered in this data submittal. _____
3. Who (name and title) is completing the questionnaire for this location? _____
4. How many federal employees (including full-time, part-time, seasonal and intermittent workers) worked at your location as of December 31, 2016? _____

INJURIES, ILLNESSES, ACCIDENTS AND NEAR MISSES

5. Did your location have any work-related incidents in CY 2016 that led to:
   - Fatality? Yes _____ No _____
   - In-patient hospitalization (see 1904.39[b][9])? Yes _____ No _____
   - Amputation? Yes _____ No _____
   - Loss of an eye? Yes _____ No _____

   If you said "**yes**" to any of the above, please provide additional information (e.g., the date, time, and location of each incident; workplace operations and the details of each incident; the cause; and whether programmatic changes or corrective actions resulted): _____

6. Did your location do anything **new** in CY 2016 to prevent:
   - Slips, trips and falls? Yes ☐ No ☐ If **yes,** please describe. _____
   - Exertion injuries? Yes ☐ No ☐ If **yes,** please describe. _____

7. Did your location implement any other **new** activities or initiatives in CY 2016 to reduce other common causes of injuries or illnesses? Yes ☐ No ☐ If **yes,** please describe. _____

8. Does your location record and track near misses? Yes ☐ No ☐ If **yes,** does your facility have a process established to evaluate near misses, identify root causes, prevent their reoccurrence and mitigate underlying hazards? Yes ☐ No ☐ Additional information (optional): _____

9. **Non-EPA workers:** This question addresses non-EPA workers, including those under the EPA's day-to-day supervision (e.g., SEE employees, grantees, commissioned officers of the Public Health Service and employees hired through the Non-Appropriated Funds Instrumentalities Act), and unsupervised contractors working on the EPA's behalf.

   a. In CY 2016, did your location have any non-EPA workers performing work in EPA-controlled spaces or on the EPA's behalf? Yes ☐ No ☐ If **yes,** please answer Questions b through e.

   b. What does your location do to ensure that non-EPA workers are operating safely and following applicable OSH rules and best practices? _____

   c. Are non-EPA workers (regardless of whether they are under the EPA's day-to-day supervision) instructed to notify the EPA of any work-related accidents or injuries/illnesses they incur while working on the agency's behalf? Yes ☐ No ☐ If **yes,** does the EPA review these incidents? Yes ☐ No ☐ Additional information (optional): _____

   d. How many work-related accidents did non-EPA workers have in CY 2016? _____ How many work-related injuries or illnesses did they have in CY 2016? _____

   e. Are there any non-EPA workers at your location working under the EPA's day-to-day supervision without onsite management oversight provided by their direct employers? Yes ☐ No ☐ If **yes,** does your location accept responsibility for documenting recordable injuries and illnesses that these workers incur? Yes ☐ No ☐ Additional information (optional): _____

10. In CY 2016, did your location have any volunteers working in EPA-controlled spaces or on the EPA's behalf? Yes ☐ No ☐ If **yes**, please answer Questions a through c.

    a. Are volunteers instructed to notify the EPA of any work-related accidents or injuries/illnesses they incur while working on the EPA's behalf? Yes ☐ No ☐ If **yes,** does the EPA review these incidents? Yes ☐ No ☐ Additional information (optional): _____

    b. How many work-related accidents did they have in CY 2016? _____ How many work-related injuries or illnesses did they have in CY 2016? _____

    c. Does your location accept responsibility for documenting recordable injuries and illnesses that volunteers incur? Yes ☐ No ☐ Additional information (optional): _____

MOTOR VEHICLE SAFETY

11. How many EPA employees drove government-owned, -leased, -rented or privately owned vehicles on official government business in CY 2016? _____
Note: In the past, some EPA locations have incorrectly submitted information on the number of trips taken rather than the number of employees who have driven over the course of the year. When tallying the number of drivers, each employee should only be counted once (regardless of how many trips they have taken).

12. How many miles did employees from your location drive on the agency's behalf in CY 2016? _____

13. As of December 31, 2016, how many employees (including temporary duty employees) did your location have who drive on official EPA business an average of two or more days per week (which translates to about 100 days per year)? _____ How many of them have taken driver safety training (either online National Safety Council [NSC] training or its equivalent, such as the General Services Administration's [GSA's] free class) within the past three years? _____

14. SHEM Guideline 31 says that EPA workers who perform field work must take general driver awareness training annually. Answer the following to help the SSD determine if that requirement is being met:

a. As of December 31, 2016, how many EPA employees from your location were designated as potential field employees? _____
Note: According to EPA Order 1440.2, the term "field activities" covers activities conducted by EPA employees outside EPA-administered facilities. These activities include, but are not limited to; criminal investigations; compliance inspections; sampling conducted under all EPA statutes; hazardous material spill and waste site investigations; and field duties with the EPA's On-Scene Coordinators, Response Support Corps, or Incident Management Teams.

b. How many of those potential field employees received driver awareness training in CY 2016? _____
Note: The training does not have to be a standalone class – instead, it can be covered in an 8-hour annual safety and health refresher course. More comprehensive driver safety training (such as the NSC or GSA courses mentioned under Question 13) would also satisfy the requirement if a field employee took it in CY 2016.

c. If some of your potential field employees did not receive driver safety training in CY 2016, please explain why. _____

15. Are any of your employees required to take additional specialized driver safety training courses, such as trailer towing safety or commercial driver training? Yes _____ No _____ If **yes:**

- Were they all up to date with these specialized training requirements as of December 31, 2016? Yes _____ No _____ If **no,** please provide details. _____
- Please identify the specialized training that your employees require. _____

16. Motor vehicle accidents involving federal civilian employees:
Note: This question asks for data on motor vehicle accidents involving federal civilian employees. The SSD is interested only in accidents that occurred when a vehicle was in motion. An accident that only damaged a parked vehicle, including damage when someone opened a door and accidentally hit an EPA vehicle, should not be counted as a motor vehicle accident. When answering, please account for accidents that affected EPA fleet vehicles as well as non-fleet vehicles (e.g., privately owned vehicles, rental vehicles, Zipcars).

a. Did EPA employees from your location have any motor vehicle accidents while on official government business in CY 2016? Yes _____ No _____ If **yes,** please answer Questions b and c.

b. How many motor vehicle accidents did EPA employees have while on official government business in CY 2016? _____ How many of these accidents resulted in personal injury? _____ Please provide a brief summary of each accident below, including the investigation outcome and the cause of the accident. For example, for each accident, indicate if distracted driving (e.g., texting or using handheld devices) was a factor and if the EPA driver was shown to be at fault (if known).

Incident #1: _____
Incident #2: _____
Incident #3: _____
Incident #4: _____
Incident #5: _____
Incident #6: _____
Incident #7: _____
Incident #8: _____
Incident #9: _____
Incident #10: _____

c. How many EPA employees were involved in the CY 2016 motor vehicle accidents? _____
- Were they all wearing seatbelts? Yes _____ No _____ If **no,** how many were not? _____
- Were all of the EPA drivers who were involved in the accidents up to date with their driver safety training requirements? Yes _____ No _____ If **no,** how many were not and why? _____

17. Has your location developed and fully implemented a motor vehicle safety program? Yes _____ No _____ If **yes,** is it a *written* program? Yes _____ No _____ When was the program last reviewed/updated? _____

18. Executive Order (EO) 13043 addresses seatbelt use, and EO 13513 bans texting while driving. Did your location implement **new** initiatives in CY 2016 (there is no need to repeat actions reported in previous years) to promote compliance with these EOs? Yes _____ No _____ If **yes,** provide details. _____

ORGANIZATIONAL QUESTIONS

19. To whom does your location's SHEMP manager report (e.g., assistant regional administrator, division director, branch chief)? _____

20. Who (name and title) is the DSHEMO for your location? _____

21. Does the SHEMP manager have direct access to the DSHEMO? Yes _____ No _____

22. Who (name and position title) has first-line authority to do the following for your location:
- Abate and control hazards. _____
- Implement operational decisions, including work stoppage if necessary. _____
- Eliminate the use of a hazardous chemical or require a less toxic substitute. _____
- Approve and obtain OSH-related resources, such as physical resources (e.g., supplies, equipment) or services (e.g., training, repairs, maintenance). _____
- Ensure that employees implement OSH-related recommendations. _____

23. Have senior managers at your location signed a safety and health management system (SHMS)

commitment statement? Yes ____ No ____ If **yes,** when was the commitment statement signed? _____ Have senior managers established any other *local* policies that communicate a clear priority for safety and health? Yes ____ No ____ If **yes,** list them and indicate when they were signed. _____

24. Briefly describe how your location addresses employee-identified OSH issues, concerns or complaints. _____ Also, please provide an example (if available) of how your organization financially handled employee OSH requests in CY 2016. (For example, where did the funds come from to acquire safety-related equipment needs or contractor support?) _____

25. How much did your location spend on OSH training in CY 2016? _____ If possible, please break out the total as follows:

- Amount resulting from direct billable hours that onsite contractors spent training employees: _____
- Fees charged by outside training vendors: _____
- Travel costs incurred to attend offsite training: _____
- Other costs: _____ Describe: _____

26. Does your location have a separate allocation within its budget to address OSH issues?
Yes ____ No ____

27. How many designated SHEM personnel does your location have to manage its OSH programs? _____

28. Was funding adequate to achieve your planned OSH goals in CY 2016? Yes ____ No ____ If **no,** please provide details. _____

ROLES, COMPETENCY, AUTHORITY AND TRAINING OF PERSONNEL RESPONSIBLE FOR OSH PROGRAMS AND TASKS

29. Has someone in your organization been assigned responsibility for performing accident investigations?
Yes ____ No ____ If **yes,** is this person a member of the SHEM team? Yes ____ No ____
Who (name/title) is the person? _____

30. Has your location identified positions (e.g., managers, SHEM staff, process operators, those managing contractor activities and maintaining OSH equipment) that hold key safety and health management responsibilities? Yes ____ No ____ If **yes,** answer Questions a through e.

a. Please list the names/titles of the top three positions in your organization that hold key safety and health management responsibilities.
_____
_____
_____

b. Has your location documented the roles, responsibilities, authorities and accountabilities (R2A2s) of its key safety and health management positions in writing? Yes ____ No ____

c. Have the R2A2s been clearly communicated to the people in these key positions?
Yes ____ No ____

d. Has your location determined and documented the basic OSH-related competency requirements (in terms of education, training and experience) that these key positions must meet?
Yes ____ No ____

e. Does your location track whether personnel who fill these key positions have satisfied their competency requirements? Yes ____ No ____ If **yes,** please provide the following data:
- How many people at your location hold key safety and health responsibilities? ____
- As of December 31, 2016, how many of them had completed their OSH-related competency requirements? ____ Additional information (optional): ____

SAFETY AND HEALTH PROGRAMS AND TRAINING ACTIVITIES

31. Please briefly describe the methods your location uses to:
- Deliver OSH training and assess competency. ____
- Evaluate the effectiveness of OSH training. ____

32. Has your location identified and documented the OSH training needs of its employees?
Yes ____ No ____ If **no,** please indicate why this task has not been completed. ____

33. Does your location actively track which OSH training requirements employees have completed?
Yes ____ No ____ If **yes:**
- What tracking system does your location use? ____
- As of December 31, 2016, what percentage of your location's employees were up to date with all of their OSH training requirements?
  ____ Less than 20 percent
  ____ Between 20 and 50 percent
  ____ Between 51 and 64 percent
  ____ Between 65 and 84 percent
  ____ At least 85 percent but less than 100 percent
  ____ 100 percent
  Additional information (optional): ____

34. Are procedures in place to ensure that managers know which employees have not completed their OSH training requirements so that appropriate job-duty restrictions can be implemented if necessary?
Yes ____ No ____ Additional information (optional): ____

35. Please provide information about your location's safety and health programs and training initiatives:

a. **Field safety program** (e.g., for workers visiting HAZWOPER sites)
- Is a field safety program established at your location?
  Yes ____ No ____ Not applicable ____ In draft form ____
  If **yes,** is it a written program? Yes ____ No ____ When was it last reviewed/updated? ____
- How many EPA employees received field safety training (initial or refresher) in CY 2016? ____

b. **Laboratory safety program**
- Is a laboratory safety program (or chemical hygiene plan) established at your location?
  Yes ____ No ____ Not applicable ____ In draft form ____
  If **yes,** is it a written program? Yes ____ No ____ When was the program last reviewed/updated? ____

- As of December 31, 2016, how many EPA laboratory employees worked at your location? _____
- How many EPA employees received laboratory safety training (initial or refresher) in CY 2016? _____

c. **Hazard communication program**

- Is a hazard communication program established at your location?
  Yes _____ No _____ Not applicable _____ In draft form _____
  If **yes,** is it a written program? Yes _____ No _____ When was the program last reviewed/updated? _____
- How many EPA employees received hazard communication training in CY 2016? _____

d. **Occupational medical surveillance program (OMSP)**

- Is an OMSP established at your location?
  Yes _____ No _____ Not applicable _____ In draft form _____
  If **yes,** is it a written program? Yes _____ No _____ When was the program last reviewed/updated? _____
- How many EPA employees were enrolled in the OMSP as of December 31, 2016? _____
  Note: When reporting the total number of OMSP enrollees, do not include "suspended" employees, such as those who do not require an exam at a regular frequency (e.g., every 12 months) for various reasons (e.g., medical leave, upcoming exit exam).
- How many of the enrollees are current with their medical examination requirements? _____
  Note: The frequency of medical examinations differs based on job descriptions. For example, some enrollees may require annual exams, but others may only require them biannually or even less often. People will be considered "medically current" if they receive examinations within their designated frequencies. A 90-day grace period is allowed. For example, someone who requires an annual exam would still be considered "medically current" at 14 months past his/her most recent examination (i.e., 60 days past the due date for another annual exam).
- If some employees are not current, please indicate why. _____
- How many EPA employees received OMSP awareness training in CY 2016? _____
- Please use an "X" to indicate what process(es) your location uses to ensure that appropriate personnel are enrolled in the OMSP:
  - _____ Job hazard analyses are conducted to determine if employees need to be enrolled.
  - _____ On a regular basis, everyone who is enrolled in the OMSP completes an OMSP application form and submits it to the local SHEMP manager for review.
  - _____ Senior management (e.g., division director) sign off on OMSP enrollment decisions.
  - _____ Other (please specify _____).

e. **Respiratory protection program**

- Is a respiratory protection program established at your location?
  Yes _____ No _____ Not applicable _____ In draft form _____
  If **yes,** is it a written program? Yes _____ No _____ When was the program last reviewed/updated? _____
- As of December 31, 2016, how many EPA employees were medically cleared to wear respirators? _____
- How many EPA employees are required to take annual fit tests? _____
  Note: The SSD acknowledges that some employees who are medically approved to wear respirators might not currently be expected to work in the field, and therefore, may not require an annual fit test. People in this category are considered "suspended" and not enrolled in the respiratory protection program.
  - How many of them completed a fit test within the past year? _____
  - If some employees are not current with fit test requirements, please indicate why. _____
- How many EPA employees received respiratory protection training in CY 2016? _____

f. **Radiation safety program**
- Is a radiation safety program established at your location?
  Yes ____ No ____ Not applicable ____ In draft form ____
  If **yes,** is it a written program? Yes ____ No ____ When was the program last reviewed/updated? ____
- How many EPA employees received radiation safety training in CY 2016? ____

g. **Bloodborne pathogen program**
- Is a bloodborne pathogen exposure control program established at your location?
  Yes ____ No ____ Not applicable ____ In draft form ____
  If **yes,** is it a written program? Yes ____ No ____ When was the program last reviewed/updated? ____
- How many EPA employees received bloodborne pathogen training in CY 2016? ____

h. **Confined space safety program**
- Does your location allow EPA employees to enter confined spaces? Yes ____ No ____
- Is a confined space safety program established at your location?
  Yes ____ No ____ Not applicable ____ In draft form ____
  If **yes,** is it a written program? Yes ____ No ____ When was the program last reviewed/updated? ____
- How many EPA employees received confined space safety training in CY 2016? ____

i. **Lockout/tagout program**
- Does your location allow EPA employees to perform lockout/tagout activities?
  Yes ____ No ____
- Is a lockout/tagout program established at your location?
  Yes ____ No ____ Not applicable ____ In draft form ____
  If **yes,** is it a written program? Yes ____ No ____ When was the program last reviewed/updated? ____
- How many EPA employees received lockout/tagout training in CY 2016? ____

j. **Personal protective equipment (PPE) program**
- Is a PPE program established at your location?
  Yes ____ No ____ Not applicable ____ In draft form ____
  If **yes,** is it a written program? Yes ____ No ____ When was the program last reviewed/updated? ____
- How many EPA employees received PPE training in CY 2016? ____

k. **Ergonomics program**
- Is an ergonomics program established at your location?
  Yes ____ No ____ Not applicable ____ In draft form ____
  If **yes,** is it a written program? Yes ____ No ____ When was the program last reviewed/updated? ____
- How many EPA employees received ergonomics training in CY 2016? ____
- Do you have a process in place at your location to proactively prevent ergonomic hazards?
  Yes ____ No ____ If **yes,** please describe. ____
- What does your location do to identify and mitigate existing ergonomic hazards? ____
- Does your location perform ergonomic assessments? Yes ____ No ____ If **yes:**
  - Does your location perform assessments upon receiving an employee complaint or a request

for reasonable accommodation? Yes ☐ No ☐ If **yes,** how many of these assessments occurred in CY 2016? ☐

- Does your location also perform at least some assessments proactively, rather than only in response to an employee complaint or a request for reasonable accommodation? Yes ☐ No ☐ If **yes,** how many proactive assessments occurred in CY 2016? ☐

l. **Vessel safety program**

- Is a vessel safety program established at your location?
  Yes ☐ No ☐ Not applicable ☐ In draft form ☐
  If **yes,** is it a written program? Yes ☐ No ☐ When was the program last reviewed/updated? ☐
- How many EPA employees received vessel safety training in CY 2016? ☐

m. **Diver safety program**

- Does your location have a dive unit? Yes ☐ No ☐
- If **yes,** is a diver safety program established at your location?
  Yes ☐ No ☐ Not applicable ☐ In draft form ☐
  If **yes,** is it a written program? Yes ☐ No ☐ When was the program last reviewed/updated? ☐
- How many EPA employees received diver safety training in CY 2016? ☐

n. **New employee general safety and health orientation**

- Do new employees at your location receive general safety and health orientation training?
  Yes ☐ No ☐ If **yes,** please indicate which of the following topics are covered in your orientation training:
  ☐ The EPA's major safety and health policies
  ☐ General safety and health rules
  ☐ Major hazards and protections
  ☐ Emergency procedures
- Did your location hire any new EPA employees in CY 2016? Yes ☐ No ☐ If **yes:**
  - How many were hired in CY 2016? ☐
  - Did they all receive general safety and health orientation training within the first three months of their employment? Yes ☐ No ☐ If **no,** please indicate how many received training, how many did not, and why training was not delivered to all of them. ☐

o. **First-line supervisors' health and safety orientation training**

SHEM Guideline 51 addresses first-line supervisors. It says "All supervisors should complete Supervisor Health and Safety Orientation Training within 6 months of assuming supervisory duties."

- How many first-line EPA supervisors were working at your location as of December 31, 2016? ☐
- How many of them have received health and safety orientation training that is tailored to meet supervisors' needs (either in CY 2016 or in previous years)? ☐
- How many of them specifically received this training in CY 2016? ☐
- How many have not received the training at all? ☐ Of those who have not (if any), how many have held supervisory duties for less than six months? ☐

p. **Collateral duty safety officers**

- How many collateral duty safety officers did your location have as of December 31, 2016? ☐
- How many of them have completed a Collateral Duty Safety and Health Course (either in CY 2016 or in previous years)? ☐

- How many of them specifically received such training in CY 2016? _____
- Additional information (optional): _____

q. **Cardiopulmonary resuscitation (CPR)/first aid program**
- Is a CPR/first aid program established at your location?
  Yes _____ No _____ Not applicable _____ In draft form _____
- If **yes,** is it a written program? Yes _____ No _____ When was the program last reviewed/updated? _____
- How many EPA employees received CPR/first aid training in CY 2016? _____
- Did any employees use CPR to assist a person in distress in CY 2016? Yes _____ No _____ If **yes,** please provide details. _____

r. **Automated external defibrillator (AED) program**
- Is an AED program established at your location?
  Yes _____ No _____ Not applicable _____ In draft form _____
  If **yes,** is it a written program? Yes _____ No _____ When was the program last reviewed/updated? _____
- How many EPA employees received AED training in CY 2016? _____
- Were AEDs used to assist a person in distress in CY 2016? Yes _____ No _____ If **yes,** please provide details. _____

s. **Occupant emergency plan (OEP)**
- Has your location established a written OEP? Yes _____ No _____ In draft form _____
- If **yes,** when was the plan last reviewed/updated? _____
- Were OEP drills performed in CY 2016? Yes _____ No _____ If **yes:**
  - How many evacuation drills were conducted? _____
  - How many shelter-in-place drills were conducted? _____

Additional information: _____

t. **Other safety and health programs**
Please list any other safety and health programs that have been established at your location if they have not already been mentioned above, and indicate when each program was most recently updated/reviewed. *(Examples include laser safety programs, electrical safety programs and biosafety programs.)* _____

u. **Other training classes**
- How many EPA employees received 40-hour HAZWOPER training in CY 2016? _____
- How many EPA employees received 8-hour HAZWOPER refresher training in CY 2016? _____
- How many EPA employees received trailer towing safety training in CY 2016? _____
- Provide information about other OSH training presented to EPA employees in CY 2016. *(Examples include fire extinguisher training, hazardous materials shipping training, heat stress and cold stress management training, and noise and hearing conservation training.)*

Name of training: _____
Number of employees trained in CY 2016: _____

Name of training: _____
Number of employees trained in CY 2016: _____

Name of training: _____
Number of employees trained in CY 2016: _____

Name of training: _____
Number of employees trained in CY 2016: _____

Name of training: _____
Number of employees trained in CY 2016: _____

Name of training: _____
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Number of employees trained in CY 2016: _____

Name of training: _____
Number of employees trained in CY 2016: _____

Name of training: _____
Number of employees trained in CY 2016: _____

Name of training: _____
Number of employees trained in CY 2016: _____

FIELD FEDERAL SAFETY AND HEALTH COUNCILS (FFSHCs)

36. Is there an FFSHC (click here for a list of councils) within 50 miles of your location? Yes _____ No _____ If **yes,** was the council active in CY 2016? Yes _____ No _____ If **yes,** please answer Questions a and b.

a. Did your location do anything to encourage staff involvement in these councils in CY 2016? Yes _____ No _____ If **yes,** please describe what was done in this regard. _____

b. Did employees or managers from your location participate in council activities in CY 2016? Yes _____ No _____ If **yes:**
- Which council(s) did they participate in (click here for a list of councils)? _____
- How many managers participated, and what were their job titles? _____
- How many non-managerial employees participated, and what were their job titles? _____
- How many council meetings were held in CY 2016? _____ How many of these meetings did EPA employees or managers attend? _____ Please indicate whether employees physically attended or participated through virtual means. _____
- Describe any other support your location offered to these councils in CY 2016. _____

SELF-ASSESSMENT/HAZARD IDENTIFICATION, TRACKING, AND MITIGATION

37. Does your location conduct regular internal OSH walkthroughs or inspections? Yes _____ No _____ If **yes,** please answer Questions a through c.

a. Please indicate who (by title) performs the inspections and briefly describe their qualifications (e.g., what training they have taken to prepare for the walkthroughs/inspections). _____

b. Do senior managers participate in these walkthroughs/inspections? Yes _____ No _____ Additional information (optional): _____

c. How often are the walkthroughs/inspections performed?
Daily or weekly
Monthly
Quarterly
Less often than quarterly but more often than annually
Annually
Additional information (optional): _____

38. Please provide two examples of **new** engineering controls (if any) that your location implemented in CY

2016 to eliminate or control workplace hazards. _____

39. Please provide two examples of actions your location took in CY 2016 to ensure that safety and health controls were performing adequately. _____

40. Did any injuries or illnesses occur at your location in CY 2016 as a result of failed hazard controls? Yes _____ No _____ If **yes,** please describe. _____

41. Did your location identify any hazards in CY 2016 that stemmed from recent facility, equipment, materials or process changes? Yes _____ No _____ If **yes,** please describe. _____

42. Has your location established mechanisms to ensure that any potential hazard or hazard-control failure identified through self-assessments, safety walkthroughs or other monitoring events is immediately corrected or appropriately scheduled for correction in action plans? Yes _____ No _____ If **yes,** please briefly describe. _____

43. Does your location have a system in place to document identified hazards, indicate when they will be corrected and track progress that is being made to address them? Yes _____ No _____ If **yes,** were any unresolved hazards listed in your tracking system at the end of CY 2016? Yes _____ No _____ If **yes,** please answer Questions a through d.

a. How many unresolved hazards did your location have at the end of CY 2016? _____

b. How many of them had been listed as hazards for more than one year? _____

c. Were any of them repeat findings? Yes _____ No _____ If **yes,** please indicate how many were repeat findings and describe each one. _____

d. Did your facility adhere to all established correction due dates in CY 2016? Yes _____ No _____ If **no,** how many of the listed corrections were behind schedule and why? _____

EMPLOYEE INVOLVEMENT IN OSH-RELATED ACTIVITIES

This section is designed to determine how involved non-supervisory and non-managerial employees are in OSH-related activities.

44. Does your location engage employees in work control planning? Yes _____ No _____ Additional information (optional): _____

45. Does your location engage employees in post-incident investigations and corrective and preventative activities? Yes _____ No _____ Additional information (optional): _____

46. Does your location seek employee input on existing or potential emerging hazards? Yes _____ No _____ Additional information (optional): _____

47. Are employees at your location engaged in safety and health self-assessments? Yes _____ No _____ Additional information (optional): _____

48. Are employees at your location asked for suggestions on how to improve their facility's safety and health

performance? Yes ____ No ____ Additional information (optional): ____

49. Has your location established procedures to ensure that employees who offer OSH-related suggestions receive confirmation and feedback on how their input will be addressed? Yes ____ No ____ Additional information (optional): ____

50. Has your location created an internal incentive or awards program to recognize EPA personnel who exhibit outstanding OSH performance or identify meaningful OSH-related improvements?
Yes ____ No ____ If **yes,** please provide details and describe efforts recognized in CY 2016. ____

51. Provide a specific example of something that your location did (other than training) in CY 2016 to remind employees of a safety and health rule or best practice. ____

52. OSHA has asked federal agencies if employees are involved in making decisions that affect the allocation of OSH resources (e.g., OSH supplies, equipment, services). Please provide examples (if any exist) of cases in which employee input (e.g., suggestions, concerns, objections) helped guide decisions about safety and health resource allocation in CY 2016. ____

53. OSHA has asked federal agencies to indicate if employees are involved in decisions that affect OSH training, such as which courses should be provided; which topics should be covered; who should deliver training; and how, when, and where the training should be delivered. Please provide examples (if any exist) of cases in which employee input helped guide decisions about OSH training in CY 2016. ____

SHMS-RELATED QUESTIONS

If your location is **not** an official SHMS reporting location, skip to Question 63.

54. Has your location fully implemented a SHMS based on the Occupational Health and Safety Assessment Series (OHSAS) 18001 standard? Yes ____ No ____ Additional information (optional): ____

55. Has your location developed a written SHMS worker participation strategy?
Yes ____ No ____ If **yes,** when was the strategy developed/updated? ____

56. Has your location developed a written SHMS internal communication strategy?
Yes ____ No ____ If **yes,** when was the strategy developed/updated? ____

57. **Action plans.** Has your location developed a written action plan or plans (e.g., Safety and Health Management Plans, or SHMPs) to map out its approach for achieving its OSH-related objectives (e.g., SHMS objectives, targets and metrics)? Yes ____ No ____
Note: SHMPs are detailed plans that outline (in stepwise fashion) what will be done to achieve specific OSH or SHMS objectives, targets and metrics. They should not be confused with safety and health programs (e.g., the personal protective equipment program, the bloodborne pathogen exposure control program).
If **"yes,"** please address the following:

- Please list the plan(s) and indicate when they were most recently reviewed/updated. ____
- Did the plan(s) identify OSH actions to be completed in CY 2016? Yes ____ No ____ If **yes,** did your location meet all the scheduled CY 2016 deadlines? Yes ____ No ____ If **no,** why not? ____

58. **SHMS awareness training**

- How many employees received SHMS awareness training in CY 2016? ____
- Please indicate which training was provided:

SkillPort training
Other (please specify _____)

- As of December 31, 2016, what percentage of your employees had completed SHMS awareness training (either in CY 2016 or in previous years)? _____%

59. Hazard Risk Assessments (HRAs). Between June 2010 and August 2012, the SSD helped SHMS reporting locations conduct comprehensive HRAs to inventory existing hazards in the workplace. Locations were supposed to update them by December 31, 2015. Please answer the following HRA-related questions:

a. When was the HRA for your location most recently updated? _____

b. Did your initial or updated HRA identify any uncontrolled hazards? Yes No If **yes,** briefly describe what has been done to control those hazards and indicate whether any uncontrolled hazards remain. _____

60. SHMS milestones. The EPA's *SHMS Implementation Guidance Manual* identifies 12 SHMS milestones. Please use the table below to report the status of each milestone as of December 31, 2016.

Milestones	Status a. (insert an "X" to mark your answer)			Additional information (optional) a.
	Not conforming	Partially Conforming	Fully Conforming	
1	_____	_____	_____	_____
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____
6	_____	_____	_____	_____
7	_____	_____	_____	_____
8	_____	_____	_____	_____
9	_____	_____	_____	_____
10	_____	_____	_____	_____
11	_____	_____	_____	_____
12	_____	_____	_____	_____

If you did not complete the table above, please indicate why (e.g., your location is pursuing a Multi-Site SHMS and the update is being provided by a different location). _____

61. Internal audits. Did your location perform an internal SHMS audit in CY 2016? Yes No If **yes,** please answer Questions a and b.

a. When was the internal audit performed? _____

b. Were audit findings identified? Yes No If **yes,** has your location already initiated, scheduled or completed corrective actions to address the audit findings? Yes No
Additional information (optional): _____

62. Management reviews. Did your location perform a SHMS management review in CY 2016? Yes No If **yes,** please answer Questions a through d.

a. When was the review performed? _____

b. Please identify (by title) the most senior person who participated. _____

c. Were the results of the most recent SHMS audit discussed during the management review? Yes ☐ No ☐ Additional information (optional): _____

d. Did senior managers propose recommendations for continual improvement? Yes ☐ No ☐ If **yes,** has a schedule been identified for implementing those improvements? Yes ☐ No ☐ Additional information (optional): _____

HEALTH AND SAFETY COMMITTEES

63. Does your location have a safety and health committee that meets regularly? Yes ☐ No ☐ If **yes,** please answer Questions a through h.

a. What is the title of the most senior person on that committee? _____

b. Please use an "X" to indicate which of the following groups participate in the committee:
☐ EPA senior management
☐ EPA facilities/infrastructure
☐ EPA environmental management
☐ EPA safety and health management
☐ Non-managerial EPA employees (e.g., technical staff, field staff, administrative staff)
☐ Employee unions
☐ External (non-EPA) entities (please specify: _____)

c. Training:

- Have all the EPA-affiliated committee members received training that covers at least basic information on federal OSH requirements; the EPA's OSH program; the agency's procedures for identifying, reporting, evaluating, and abating hazards; and procedures for recognizing hazardous conditions and environments? Yes ☐ No ☐ If **no,** please indicate:
  - How many committee members have taken basic training? _____
  - How many have not? _____
- Have all the EPA-affiliated committee members completed Collateral Duty Safety and Health Training? Yes ☐ No ☐
  Note: SHEM Guideline 51 says "At a minimum, Safety Committee members and other employees who have been assigned health and safety duties shall complete the Collateral Duty Safety and Health Course prior to assuming health and safety responsibilities."
  If **no,** please indicate:
  - How many committee members have taken Collateral Duty Safety and Health Training? _____
  - How many have not? _____

Additional information (optional): _____

d. How often does the committee meet? _____

e. Does the committee have a charter that outlines roles and responsibilities? Yes ☐ No ☐ Additional information (optional): _____

f. Are meeting minutes developed? Yes ☐ No ☐ If **yes,** are the minutes submitted to senior management? Yes ☐ No ☐

g. Is a mechanism in place to ensure that any OSH-related concerns that the committee identifies are elevated and addressed by senior managers? Yes ☐ No ☐ If **yes,** please describe. ☐

h. Do committee members participate in safety walkthroughs or inspections? Yes ☐ No ☐ Additional information (optional): ☐

OTHER OSH INFORMATION

64. International travel:

a. Are measures in place to ensure that SHEMP managers are notified before employees participate in international travel? Yes ☐ No ☐ Additional information: ☐

b. Did EPA employees from your location travel overseas or out of the country on the agency's behalf in CY 2016? Yes ☐ No ☐ Unknown ☐ If **yes:**

- How many EPA employees traveled out of the country in CY 2016? ☐
- Please briefly describe what type of work they performed and where they went. ☐
- What actions did your location take to ensure that their OSH requirements were met while they were out of the country? ☐
- Did employees require additional safety and health training to prepare for their assignment abroad? Yes ☐ No ☐ If **yes,** please indicate what training was provided. ☐

65. Does your location have asbestos-containing materials? Yes ☐ No ☐ Unknown ☐ If **yes:**

a. Have all potential sources of asbestos-containing materials been identified? Yes ☐ No ☐ Unknown ☐ Additional information (optional): ☐

b. Is an asbestos management plan in place? Yes ☐ No ☐ If **yes,** when was it last updated/reviewed? ☐

66. Are any sources of lead present in your building? Yes ☐ No ☐

Note: The intent is to capture building-related lead sources. When answering this question, respondents do not need to account for lead that is being used for research purposes, laboratory's hood sash counterweights that are made of lead, or shields or lead bricks that are used to shield radiation sources.

If **yes,** please indicate**:**

a. Does your building have lead-based paint? Yes ☐ No ☐ Unknown ☐ If **yes,** please describe. ☐

b. Are other sources of building-related lead present at your location (e.g., lead in the water, lead dust)? Yes ☐ No ☐ Unknown ☐ If **yes,** please describe. ☐

c. Is a lead management plan in place? Yes ☐ No ☐ If **yes,** when was it last updated/reviewed? ☐

67. Did representatives from OSHA or another external safety and health authority (e.g., state or local regulatory agencies) visit or inspect your location in CY 2016 to determine if it is complying with all applicable OSH requirements? Yes ____ No ____ If **yes,** please address Questions a through e.

a. Please use an "X" to indicate why your facility received a visit:
____ Response to a worker complaint submitted by an EPA or non-EPA worker
____ Response to a fatality or catastrophic incident
____ Routine program evaluation
____ Response to a request for consultation
____ Other (please specify _____)

b. Were the visits announced or unannounced? _____

c. Which of your safety and health programs were inspected? _____

d. Were any *Notices of Unsafe or Unhealthy Working Conditions* issued in CY 2016?
Yes ____ No ____ If **yes,** please provide details. For example, describe the hazard identified in the notice and indicate whether abatement was tracked to closure. Or, if your location appealed the notice, describe any interim actions taken to protect employees until the appeal was resolved. _____

e. Were any other instances of noncompliance or potential concern identified? Yes ____ No ____ If **yes,** please provide details and indicate whether corrective actions have been taken. _____

68. Has your location established a procedure to ensure that the SHEMP manager (or another designated official) is notified before new chemicals (e.g., cleaning chemicals, pesticides, laboratory chemicals) are introduced to the facility? Yes ____ No ____ If **yes,** does the SHEMP manager evaluate the chemical's Safety Data Sheet (previously referred to as a Material Safety Data Sheet) to determine if it poses a safety or health hazard that requires protective measures? Yes ____ No ____ If such hazards are identified during SDS review, is immediate action taken to address the hazard? Yes ____ No ____ Additional information (optional): _____

69. Has your location established a process to ensure that the SHEMP manager (or another designated official) is notified of building-related modification projects **before** the modifications are made?
Yes ____ No ____ If **yes,** are written procedures in place to ensure that he/she signs off on the modifications? Yes ____ No ____ Additional information (optional): _____

70. Does your location track its medical emergencies? Yes ____ No ____ If **yes:**
- How many medical emergencies occurred in CY 2016? _____
- How many times was 911 called in CY 2016? _____

Additional information (optional): _____

71. Based on existing whistleblower protections, employees must not be subjected to restraint, interference, coercion, discrimination or reprisal for reporting an unsafe or unhealthy working condition. In CY 2016, did any employees from your location allege unfair reprisal for reporting an OSH issue?
Yes ____ No ____ If **yes,** provide a brief overview of the investigation that was performed to assess the allegation. _____

72. Does your location operate a laboratory? Yes ____ No ____ If **yes,** answer Questions a through d.

a. Does your laboratory have fume hoods or biological safety cabinets? Yes ____ No ____ If **yes:**

- Is a performance test conducted on each hood and/or cabinet annually? Yes ____ No ____
- Does the SHEMP manager review the test results to check whether there has been any change in performance over time? Yes ____ No ____
- If problems are identified, what corrective actions are taken to address them? ____

b. Are processes established to ensure that your SHEMP manager (or another designated official) is notified of new research projects or new analytical procedures that are under consideration? Yes ____ No ____ If **yes,** are written procedures in place to ensure that he/she signs off on new projects/procedures before they are implemented? Yes ____ No ____ Additional information (optional): ____

c. Is your laboratory involved with (or planning to be involved with) assessing samples that contain chemical warfare agents? Yes ____ No ____ If **yes,** briefly describe those activities. ____

d. Is your laboratory involved with (or planning to be involved with) nanotechnology research? Yes ____ No ____ If **yes,** please provide specific information about the materials used (e.g., particle type) and briefly describe your research activities. ____

73. Please provide a brief summary of your location's main CY 2016 OSH-related accomplishments. ____

74. Please identify any significant OSH goals or initiatives that your location plans to implement in CY 2017 or beyond. ____

75. Please describe any OSH-related challenges that you wish to communicate to the SSD, or let us know if you have identified areas where the SSD's support is needed to address a safety or health issue. ____

FINAL STEPS

Senior Manager Review: Has your senior manager reviewed your completed questionnaire and approved the answers provided? Yes ____ Not yet ____ If **yes,** who performed the review? ____

Even if you selected **"not yet,"** please submit your questionnaire to the SSD by **February 17, 2017.** Your senior manager may review your responses after this deadline, but Jamar Jackson (jackson.jamar@epa.gov) must be notified when approval has been granted. **Any changes that you make after your initial submittal must be communicated directly to Mr. Jackson to ensure that the updated information is transferred to the SSD's master database.**

Submittal: Thank you for completing this questionnaire. Please email the completed file directly to Jamar Jackson. Please keep the document in Microsoft Word format, as this document has been designed to automatically upload the data-entry fields directly into a central database. **Please do not convert this file to a PDF before submittal, as doing so would compromise our automated data extraction step.**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL VEHICLE AND FUEL EMISSIONS LABORATORY
2565 PLYMOUTH ROAD
ANN ARBOR, MICHIGAN 48105-2498

OFFICE OF
AIR AND RADIATION

MEMORANDUM 1-5-17

SUBJECT: Notice of Decision on California's Request for an Authorization for its In-Use Diesel-Fueled Transportation Refrigeration Units (TRUs) and TRU Generator Sets and Facilities Where TRUs Operate Regulation

FROM: Christopher Grundler, Director
Office of Transportation and Air Quality

TO: Janet G. McCabe
Principle Deputy Assistant Administrator
Office of Air and Radiation

PURPOSE

The attached notice for your signature announces EPA's decision on a request from the California Air Resources Board (CARB) for an authorization pursuant to section 209(e) of the Clean Air Act, for amendments to California's Transportation Refrigeration Units (TRUs) and TRU Generator Sets and Facilities Where TRUs Operate Regulation (2011 TRU Amendments). EPA's decision also confirms that certain of the 2011 TRU amendments are within the scope of prior EPA authorizations. TRUs are refrigeration systems powered by integral internal combustion engines designed to control the environment of temperature sensitive products that are transported in trucks and refrigerated trailers. TRUs may be capable of both cooling and heating. A TRU Generator Set is a generator set that is designed and used to provide electric power to electrically driven refrigeration units of any kind. The 2011 TRU Amendments primarily provide owners of TRU engines with certain flexibilities; clarify recordkeeping requirements for certain types of TRU engines; establish requirements for businesses that arrange, hire, contract, or dispatch the transport of goods in TRU-equipped trucks; and address other issues that arose during the initial implementation of the TRU regulation. This notice announces EPA's decision and provides a detailed rationale.

DEADLINE

There are no deadlines associated with this action.

OVERVIEW

Section 209(e)(2) of the Clean Air Act requires the Administrator to grant California an

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authorization to adopt and enforce state emission standards for new and in-use nonroad engines and vehicles that are not otherwise preempted by section 209(e)(1). EPA must grant an authorization under section 209(e)(2) unless EPA finds that California does not satisfy at least one of three statutory criteria: (1) whether California's determination that its standards, in the aggregate, are at least as protective of public health and welfare is arbitrary and capricious; (2) whether California needs its own standards to meet compelling and extraordinary conditions; and (3) whether California's standards are consistent with section 209 (e.g., whether CARB's standards are technologically feasible within the lead time provided, giving due consideration to cost, etc.). EPA may confirm that certain California regulations and amendments are within the scope of prior authorizations issued by EPA (typically when such amendments do not set new more stringent emission standards and are instead designed to provide regulatory clarity or compliance flexibility). EPA issues such confirmations if the amendments do not undermine CARB's protectiveness determination (under (1) above), the amendments are not inconsistent with section 209 (under (3) above), and the amendments do not otherwise raise new issues.

By letter dated March 2, 2015, CARB submitted a request to EPA for authorization of the 2011 TRU Amendments. CARB requested EPA perform two types of review. First, CARB requested an EPA determination that certain provisions of the 2011 Amendments are within the scope of the prior authorizations (Within-the-Scope Amendments). The Within-the-Scope Amendments provide owners of 2003 and older MY TRUs an extension of certain compliance dates if the TRUs complied with the certain standards by specified dates. Such TRU engines that are 2001 MY and older are given an extension to December 31, 2016 for the ULETRU deadline, 2002 MY TRUs are given a new deadline of December 31, 2017, and 2003 MY TRUs are given a new deadline of December 31, 2018. The Within-the-Scope Amendments also provide up to a one-year extension of the compliance dates if owners demonstrate that compliant technology is unavailable or is delayed due to financing, delivery, or installation and provides other flexibilities based upon certain requirements. In addition, the Within-the-Scope Amendments provide a host of new or clarified exemptions. Lastly, the Within-the-Scope Amendments clarify that the in-use performance standards and associated compliance deadlines are to be based on the year the TRU unit itself was manufactured instead of basing the compliance deadline on the model year of the TRU engine.

Second, CARB requested full authorization for amendments that revise standards or establish new requirements ("Full Authorization Amendments"). These provisions include amendments that require new replacement engines to meet more stringent requirements than the original TRU engines. The Full Authorization Amendments also provide that to the extent TRUs now may be repowered with rebuilt engines such rebuilt engines must meet more stringent emission standards than the standards of the original engine, and provided the engines are rebuilt by engine rebuilders in compliance with federal and state engine rebuilding requirements for off-road compression ignition engines. The Full Authorization Amendments establish new recordkeeping requirements that will require the application of hardware to monitor the engine hour usage of the TRUs along with other automated monitoring, recordkeeping and reporting requirements. The Full Authorization Amendments also create new disclosure requirements for TRU original

equipment manufacturers as well as disclosure requirements for dealers and repair shops in order that registration information is supplied to the end-user.

On November 7, 2015, EPA published a notice of opportunity for written comment and offered a public hearing on California's request. EPA requested comment on whether the Within-the-Scope Amendments should be considered under a within-the-scope analysis. Second, EPA requested comment on whether the Within-the-Scope Amendments would satisfy the criteria for full authorization if they do not meet the criteria for within-the-scope analysis. Third, EPA sought comment on whether the Full Authorization Amendments satisfy the full authorization criteria. EPA received no request for a public hearing. Consequently, EPA did not hold a public hearing. EPA received one written comment (regarding the technological feasibility of an electronic tracking and reporting requirement, and seeking regulatory clarification). CARB provided EPA with a response comment that adequately addressed the technological concern by pointing to the use of existing technology.

After review of the Full Authorization Amendments and the authorization support documents submitted by CARB (including the response comment submitted by CARB), the EPA staff conclusion is that the statutory criteria are clearly met, and that California's request for a full authorization should be granted. In addition, the EPA staff conclusion is that the Within-the-Scope Amendments meet the criteria for a within-the-scope authorization.

ANTICIPATED PUBLIC AND STAKEHOLDER RESPONSE

As stated above, EPA received only one minor comment on CARB's authorization request, which was reasonably addressed. Based on discussion with California and that manufacturers and fleet owners/operators are complying with CARB's 2011 TRU Amendments, we anticipate no negative external reaction.

INTERNAL DEVELOPMENT AND REVIEW PROCESS

OGC has concurred with this notice.

IMPACTS

There is no direct impact from this Decision on EPA's regulations.

STAKEHOLDER INVOLVEMENT

Stakeholders had an opportunity to participate in CARB's development of the 2011 TRU Amendments. We also provided an opportunity for stakeholder involvement as part of our notice of opportunity for public hearing and comment.

PEER REVIEW

There were no major scientific or technical products supporting this action as defined by the Agency's Peer Review Handbook. Therefore, we did not submit any support documents for peer review.

OMB TRANSACTION
This notice is not subject to OMB review under E.O. 12866.

RECOMMENDATION
I recommend that you sign the attached notice for publication in the *Federal Register*.

Attachment

To: Rich Kassel[rich.kassel@gladstein.org]
From: Grundler, Christopher
Sent: Tue 1/31/2017 2:54:54 PM
Subject: Re: ACT Expo, MSTRS task, catching up for 2017

Nice to hear from you Rich. I have passed the speaking request on to Bill For his advice. I think it's a bit early to say how our priorities will shake out--I will know more when we have an Administrator and AA. It's fair to assume that things will slow down for awhile until things hopefully settle down.

Best, Chris

Christopher Grundler, Director
Office of Transportation and Air Quality
U.S. Environmental Protection Agency
202/564-1682 (Washington DC)
734/214-4207 (Ann Arbor MI)

On Jan 26, 2017, at 3:31 PM, Rich Kassel <rich.kassel@gladstein.org> wrote:

Hi Chris –

We haven't spoken in a bit, so this email will cover a few things.

First, you'll recall that GNA runs the Advanced Clean Transportation Expo (ACT Expo) every year. This year, we'll be hosting it in Long Beach, CA, from May 1 - 4. We're having two sessions that will cover the EPA/NHTSA Phase 2 rules. First, we'll be having a general session called "Focusing Freight on Efficiency" on the morning of May 3, which will focus on new vehicle and engine standards and the strategies that will be used by fleets to innovate and comply. Second, we're having a workshop/forum session on the morning of May 4 called the "Ultra Clean Heavy-Duty Summit," which will focus on the range of near-zero and zero-emission technologies that are being developed for the MD and HD sectors. I'd like to invite you to speak at one or both, or ask you to suggest another OTAQ person to represent the office. My guess is that Matt would be the right person if you don't come (he did a great job at our ultra-low NOx meeting in Chicago last fall), but I'll leave that up to you, of course. In the spirit of full, early disclosure, I'm not sure if I will be in California that week, but you'll recall that the ACT Expo attracts a large, knowledgable crowd, and it's a good audience for EPA's great work. More information about the two sessions is below.

Second, I've spoken with Kathryn about the MOVES work group membership issue. I'm

reviewing some materials that she sent me this morning, and will be sending the letter that she requested shortly. Before I do, however, can I get a few minutes of your time to ask a question that I'm wondering about?

Last, it's a new year, and I'd love to chat a bit about the office's priorities for the year ahead. Regardless of whether I'm wearing MSTRS hat, my GNA hat, or any of my other hats on that call, I'm really asking to chat a bit about how I can best help you and the Office succeed in the challenging year that lies ahead.

I hope this message finds you well.

Talk to you soon,

Rich

May 3, 2017

8:30 a.m. - 10:45 a.m.

GENERAL SESSION

Medium- and Heavy-Duty General Session

9:45 a.m. - Focusing Freight on Efficiency

Building on the opening session, this panel will provide additional details on industry efficiency improvement projects and strategies, as well as insight into how these near-term efforts then connect to the longer-term evolution to truck platooning, automation and potentially driverless trucks. This session will start off by diving deeper into the EPA's Phase 2 GHG Rule to help fleet customers understand what this regulation will really mean to their future planning and procurement plans. Higher costs; increased vertical integration of truck, engine, and powertrain components; and fewer options from OEMs are expected. With implementation of the trailer standards set to take effect in 2018, and the truck and engines standards in 2021, hear from industry leaders on this session about what these new standards and rules mean to your fleet and future procurement costs and options. Beyond the EPA Phase 2 GHG Rule, get an update on the second round of SuperTruck funding. SuperTruck II projects will research, develop, and demonstrate technologies to improve heavy-truck

freight efficiency by more than 100 percent, relative to a manufacturer's best-in-class 2009 truck, with an emphasis on technology cost-effectiveness and performance. Hear which OEMs are participating, what technologies they will be testing, and what goals they hope to achieve.

US EPA (invited)

Volvo (tentatively confirmed; awaiting speaker)

US DOE SuperTruck (invited)

NACFE (invited as a moderator)

May 4, 2017

9:00 a.m. - 11:45 a.m.

WORKSHOPS & FORUMS

Ultra Clean Heavy-Duty Vehicle Summit

The heavy-duty vehicle sector is at the dawn of a new era-one characterized by an array of zero emission technology. From full battery electric trucks, buses, and other equipment to hydrogen fuel cell trucks that can travel 1,200 miles, what will the future look like? Not to be left behind, ultra-low emission heavy-duty natural gas and propane autogas engines are here today, and many believe we will see diesel engines fight back in the coming years. Local, state, and federal regulators have noticed these advancements and are charging ahead with low-NOx rule-making efforts at the national level and in California. Meanwhile, leading progressive fleets are making big investments in these zero and near zero emission technologies which, when combined with renewable fuels, can provide a heavy-duty vehicle platform that has virtually no emissions. Find out first-hand how the heavy-duty sector is poised to do a 180 and go from the largest source of regional criteria emissions and greenhouse gas emissions to a sector that contributes almost no harmful air emissions. Hear from leading stakeholders on these fast-paced developments in the market so that you understand what is real, what is happening, and when these products will be required and available.

Regulatory Landscape**:** US EPA (invited)**;** CARB (invited); SCAQMD (invited)

Electric: Andy Swanton, BYD (confirmed); Fuso; Trevor Milton, Nikola (confirmed); Michael Simon, Transpower (invited)

Gaseous Fuels**:** Joe Thompson Roush, CWI, eControls

Future of Diesel: CARB, Volvo

Rich Kassel

Senior Vice President
Gladstein, Neandross & Associates

5 Penn Plaza, 23rd Floor

New York, NY 10001

212.849.6861 direct

Ex. 6 - Personal Privacy cell

rich.kassel@gladstein.org

-

<image001.gif>

Rethink Methane Symposium | *February 21-22, 2017 – Sacramento, CA*

Advanced Clean Transportation "ACT" Expo | *May 1-4, 2017 – Long Beach, CA*

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To: Haugen, David[haugen.david@epa.gov]
From: SAE International
Sent: Thur 3/2/2017 5:27:20 PM
Subject: Create the Future Contest Now Accepting Entries

Hello David,

The world's premier engineering design competition is now accepting entries at www.createthefuturecontest.com. The 15th annual "Create the Future" Design Contest offers a top prize of $20,000 USD. There is no cost to enter, and everything to gain.

Do you have a new product, invention, or design idea that could create jobs, improve daily life, save time/money, help the environment, or benefit society in other ways? We invite you to enter as an individual or team in seven categories:

- Aerospace & Defense
- Automotive/Transportation
- Consumer Products
- Electronics/Sensors/IoT
- Machinery/Automation/Robotics
- Medical
- Sustainable Technologies

Past contests have generated over 13,000 new product designs from engineers, students, and entrepreneurs in more than 100 countries. With millions of visitors to the contest site and global media coverage, the contest shines a bright light on innovative ideas, helping entrants to attract funding, partners, and manufacturers to become commercial success stories. Your design could be next!

To get started, visit www.createthefuturecontest.com. Watch the trailer here.

Good luck,

Joe Pramberger
President
Tech Briefs Media Group (contest producer)
An SAE International Company

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SAE International | 400 Commonwealth Drive | Warrendale, PA 15096 USA | Contact Us

CONNECT WITH US

To: Gururaja, Prashanth[Gururaja.Prashanth@epa.gov]; Blubaugh, Jim[Blubaugh.Jim@epa.gov]; Haugen, David[haugen.david@epa.gov]; Brusstar, Matt[brusstar.matt@epa.gov]; Steele, Lauren[steele.lauren@epa.gov]; Kandil, Shereen[Kandil.Shereen@epa.gov]
Cc: Spears, Matthew[spears.matthew@epa.gov]; Jackson, Cleophas[jackson.cleophas@epa.gov]; Healy, Stephen[healy.stephen@epa.gov]; Duncan, Allen[duncan.allen@epa.gov]
From: Johnson, Dennis
Sent: Mon 3/6/2017 7:11:46 PM
Subject: RE: Saudi Energy office visit to NVFEL March 7th
SmartWay Technologies_Johnson_March 2017.pptx

All,

Attached is my presentation for the delegation.

Dennis

From: Gururaja, Prashanth
Sent: Monday, March 06, 2017 1:11 PM
To: Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Haugen, David <haugen.david@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Steele, Lauren <steele.lauren@epa.gov>; Johnson, Dennis <Johnson.Dennis@epa.gov>; Kandil, Shereen <Kandil.Shereen@epa.gov>
Cc: Spears, Matthew <spears.matthew@epa.gov>; Jackson, Cleophas <jackson.cleophas@epa.gov>; Healy, Stephen <healy.stephen@epa.gov>; Duncan, Allen <duncan.allen@epa.gov>
Subject: RE: Saudi Energy office visit to NVFEL March 7th

All,

Attached is the presentation for the HD GHG Phase 2 topic. It includes both my slides and Lauren's slides into one hopefully smooth presentation. Please let us know if you need anything else.

Thanks,

Prashanth

From: Blubaugh, Jim
Sent: Wednesday, March 01, 2017 3:43 PM
To: Haugen, David <haugen.david@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Gururaja, Prashanth <Gururaja.Prashanth@epa.gov>; Steele, Lauren <steele.lauren@epa.gov>; Johnson, Dennis <Johnson.Dennis@epa.gov>; Kandil, Shereen <Kandil.Shereen@epa.gov>
Cc: Spears, Matthew <spears.matthew@epa.gov>; Jackson, Cleophas <jackson.cleophas@epa.gov>; Healy, Stephen <healy.stephen@epa.gov>; Duncan, Allen <duncan.allen@epa.gov>
Subject: FW: Saudi Energy office visit to NVFEL March 7th

Everyone,

Looks like we are still on for the Saudi visit to NVFEL next Tuesday. Shereen, is that still the case?

Can each of you who is presenting material send along your presentations to everyone on this note so each of us have a copy? Dennis and I will be connecting via videoconference to the presentation/discussion part of the agenda.

I will plan to open the meeting (it will be a little awkward via video) but we will manage. Then, Dennis will begin the presentations with a short briefing on tech verification. Then to Prashanth and then to Lauren. Please keep each of your talks to roughly 15-20 mins as I know our guests will have questions. Matt and David will take over at 10 AM and take it from there.

Finally, since there are a number of guests, can one of you please send the visitor list to the guards desk so they are notified prior to Tuesday morning.

Thanks again to everyone for your help here.

-Jim

From: Blubaugh, Jim
Sent: Wednesday, February 22, 2017 11:44 AM
To: Haugen, David <haugen.david@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Gururaja, Prashanth <Gururaja.Prashanth@epa.gov>; Steele, Lauren <steele.lauren@epa.gov>; Kandil, Shereen <Kandil.Shereen@epa.gov>; Johnson, Dennis <Johnson.Dennis@epa.gov>
Cc: Spears, Matthew <spears.matthew@epa.gov>; Jackson, Cleophas <jackson.cleophas@epa.gov>; Healy, Stephen <healy.stephen@epa.gov>; Duncan, Allen <duncan.allen@epa.gov>
Subject: RE: Saudi Energy office visit to NVFEL March 7th

Everyone,

Update: We have a conference room reserved in the lab. The meeting will be held in lab conference rooms A&C. And, DC staff will be connected via videoconference for the general HDV GHG discussion. An updated agenda is attached.

Thanks,

Jim

From: Blubaugh, Jim
Sent: Wednesday, February 15, 2017 10:35 AM
To: Haugen, David <haugen.david@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Gururaja, Prashanth <Gururaja.Prashanth@epa.gov>; Steele, Lauren <steele.lauren@epa.gov>; Kandil, Shereen <Kandil.Shereen@epa.gov>
Cc: Spears, Matthew <spears.matthew@epa.gov>; Jackson, Cleophas

<jackson.cleophas@epa.gov>; Healy, Stephen <healy.stephen@epa.gov>
Subject: Saudi Energy office visit to NVFEL March 7th

Everyone,

To date, we have confirmed the Saudi Energy Efficiency Program visit to NVFEL on March 7, 2017. I have attached a draft agenda for the half day visit as well as a list of the visitors that we expect to travel to the U.S. Also, included with the visitor listing is a reminder of the questions the Saudis have asked about our HDV GHG program to be addressed during the initial discussion period. ASD-Prashanth and CD-Lauren have the lead here.

David – your team was reserving a large conference room in the lab. Please add the room information to the agenda.

Shereen – please let everyone cc:'d here know if there are any changes/updates to this visit. And, as was mentioned in previous email traffic, we assume that your team is taking care of the Homeland Security requirements for this visit.

Thanks,

Jim

Jim Blubaugh, Director

International

Office of Transportation and Air Quality

U.S. Environmental Protection Agency

(202) 564-5403

To: OAR-OTAQ-TATD Managers[OAROTAQTATD_Managers@epa.gov]
Cc: Kargul, John[kargul.john@epa.gov]; Klavon, Patty[Klavon.Patty@epa.gov]; Olson, Brian[olson.brian@epa.gov]; Houston, Michelle[houston.michelle@epa.gov]; Kliza, Frances[Kliza.Frances@epa.gov]; Wasenko, Barbara[Wasenko.Barbara@epa.gov]; Johnson, Francene[Johnson.Francene@epa.gov]; Curtis, Rhonda[Curtis.Rhonda@epa.gov]; Underwood, Shirley[underwood.shirley@epa.gov]; Simpson, Krista[Simpson.Krista@epa.gov]; Roman, Charita[roman.charita@epa.gov]
From: McAllen, James
Sent: Thur 2/23/2017 6:22:27 PM
Subject: Managers Reports for FY16 & FY17
Combined_FY16&FY17Feb22_2017.xlsx
FY17Feb22_2017.XLSX
FY16Feb22_2017.XLSX

Good Afternoon,

Attached are the Combined FY16 & FY17 Managers Report and each year's individual Managers Report as of February 22, 2017.

Note: FY17 budgets have not been finalized or allocated.

These reports are housed in H:\TATD\Managers Reports.

If you have any questions regarding these reports please contact Krista Simpson or myself.

James McAllen

Financial Support Specialist

Senior Service America, Inc.

Supporting the EPA through a Cooperative Agreement under the SEE Program

2565 Plymouth Road

Ann Arbor, MI 48105

PH: 734-214-4159

To: Brusstar, Matt[brusstar.matt@epa.gov]; Peralta, Maria[Peralta.Maria@epa.gov]; Spieth, John[Spieth.John@epa.gov]
Cc: Watkins, Erica[Watkins.Erica@epa.gov]; Barba, Daniel[Barba.Daniel@epa.gov]
From: Imfeld, Sterling
Sent: Mon 2/13/2017 3:26:43 PM
Subject: RE: CDL Training For EPA employees

Ex. 5 - Deliberative Process

There is some complexity here that is belied by straightforward discussion of training.

Sterling

From: Brusstar, Matt
Sent: Monday, February 13, 2017 9:29 AM
To: Imfeld, Sterling <imfeld.sterling@epa.gov>; Peralta, Maria <Peralta.Maria@epa.gov>; Spieth, John <Spieth.John@epa.gov>

Cc: Watkins, Erica <Watkins.Erica@epa.gov>; Barba, Daniel <Barba.Daniel@epa.gov>
Subject: FW: CDL Training For EPA employees

Sterling, John—

Below is information regarding the cost of CDL training. The course is offered at ABC out in Jackson, using their leased vehicle. Another possible option (for the same cost) is to train at NVFEL using our own vehicle (rep tractor?).

The objective is to eventually get people trained who want this opportunity, to give us flexibility while upholding fairness. The key word here, though, is "eventually"…I would suggest that we identify 2-3 individuals this week to take the training, and defer any others. This will solve a fairly immediate need, but will mean that we'll keep in mind a "second wave" of trainings, possibly later this year or next year.

At this time, I think we've selected Coon, Higgins and Jedele. The cost is fairly high, but anyone see reason not to get these three trained?

Matt

From: Derksen, Kimberly
Sent: Monday, February 13, 2017 8:43 AM
To: Brusstar, Matt <brusstar.matt@epa.gov>
Subject: FW: CDL Training For EPA employees

ABC TRAINING (see information below) DO offer on-site training!

From: abctraining2@frontiernet.net [mailto:abctraining2@frontiernet.net]
Sent: Monday, February 13, 2017 8:37 AM
To: Derksen, Kimberly <derksen.kimberly@epa.gov>
Subject: Re: CDL Training For EPA employees

Hi Kim -

The costs are all the same. (See previous emails below)

We can do on-site training if you have a vehicle to use for that. Our semi pretty much stays in Jackson.

Let me know if you have any other questions.

Becky Konkle
ABC Training and Testing
Secretary of Training and Testing
tel: (800) 914-4605
fax: (517) 563-2649

***Join us on Facebook!! http://www.facebook.com/pages/ABC-Training-and-Testing/181194526327

From: "Derksen, Kimberly" <derksen.kimberly@epa.gov>
To: "abctraining2@frontiernet.net" <abctraining2@frontiernet.net>
Sent: Monday, February 13, 2017 8:25 AM
Subject: FW: CDL Training For EPA employees

Good morning!

We're looking in to CDL training for some more employee's here at the EPA's National Vehicle and Fuel Emission's Laboratory in Ann Arbor.

Can you tell me if you offer ON-SITE training, and if so, details/cost of the training.

Appreciate your assistance!

Kim Derksen

Division Secretary

Testing & Advanced Technology Division

734.214.4272

From: abctraining2@frontiernet.net [mailto:abctraining2@frontiernet.net]
Sent: Tuesday, February 16, 2016 9:30 AM
To: Ludlam, Scott <Ludlam.Scott@epa.gov>
Subject: Re: CDL Training For EPA employees

Scott -

Thank for contacting ABC Training and Testing!

Below, you will see two options for training. The cost listed is for a single person. If you have more than one individual needing training, the price would be reduced by $500 for each person training at the same time. We can train up to three people at a time.

Ex. 4 - CBI

Ex. 4 - CBI

Just let us know if you have any other questions.

Thanks again!

Becky Konkle
ABC Training and Testing
Secretary of Training and Testing
tel: (800) 914-4605
fax: (517) 563-2649

***Join us on Facebook!! http://www.facebook.com/pages/ABC-Training-and-Testing/181194526327

From: Janet Gamet <jkgamet@gmail.com>
To: becky@abctrainingandtesting.com
Sent: Tuesday, February 16, 2016 9:20 AM
Subject: Fwd: CDL Training For EPA employees

---------- Forwarded message ----------
From: **Ludlam, Scott** <Ludlam.Scott@epa.gov>
Date: Fri, Feb 12, 2016 at 10:49 AM
Subject: CDL Training For EPA employees
To: "janet@abctrainingandtesting.com" <janet@abctrainingandtesting.com>
Cc: "Brown, Garrett" <Brown.Garrett@epa.gov>

Janet,

At the EPA's National Vehicle and Fuel Emission's Laboratory in Ann Arbor, we have recently installed a Heavy Duty Vehicle Chassis Dynamometer. With the ability to conduct testing on heavy duty vehicles now, a new requirement is to have anyone that will be driving to possess a valid CDL for the class of vehicle being driven. To secure funding for this training, I need a detailed description of what the training includes. Can you provide this and include the total cost?

CDL details:

∀ We will be pursuing a Class A license (I believe this will cover the other classes as well)

∀ We will need a rental for the skills test

Let me know if there is anything I need to clarify

Thank You,

Scott Ludlam

Mechanical Engineer
US Environmental Protection Agency
National Vehicle & Fuels Emissions Laboratory
Testing and Advanced Technology Division
Advanced Testing Center
2565 Plymouth Road
Ann Arbor, MI 48105
Phone: 734.214.4686
email: ludlam.scott@epa.gov

--

Janet K. Gamet

ABC Training & Testing, LLC

janet@abctrainingandtesting.com

800-914-4605, 517-563-2005

To: Haugen, David[haugen.david@epa.gov]
From: Kandil, Shereen
Sent: Tue 1/24/2017 2:54:16 PM
Subject: RE: إعادة توجيه: Fuel Economy lab visit (NVFEL)

Thanks, David. Is there a way we can find out about GHG and SmartWay?

Shereen Kandil
Communications Director * Public Participation Specialist * MENA Program Manager
U.S. EPA, Office of International and Tribal Affairs
202-564-6433 (office)
202-768-0511 (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide
http://www.epa.gov/international-cooperation
http://www.epa.gov/tribal

From: Haugen, David
Sent: Tuesday, January 24, 2017 8:27 AM
To: Kandil, Shereen <Kandil.Shereen@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

Shereen,
March 7th will work fine for the lab tour. I cannot speak for Cheryl or Matt on the HD GHG or SmartWay briefings.
Thanks, David

From: Kandil, Shereen
Sent: Monday, January 23, 2017 5:26 PM
To: Haugen, David <haugen.david@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>
Cc: Ferland, Henry <Ferland.Henry@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Harnisch, Will <Harnisch.Will@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

Hello all,

The team prefers to conduct the tour on Tuesday (March 7th) if that is possible. The delegation

will consist of 15 members in total. I will send you the names of the delegation once I receive them.

Thank you,
Shereen

Shereen Kandil
Communications Director * Public Participation Specialist * MENA Program Manager
U.S. EPA, Office of International and Tribal Affairs
202-564-6433 (office)
202-768-0511 (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide
http://www.epa.gov/international-cooperation
http://www.epa.gov/tribal

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From: Haugen, David
Sent: Wednesday, January 04, 2017 4:16 PM
To: Bynum, Cheryl <bynum.cheryl@epa.gov>; Kandil, Shereen <Kandil.Shereen@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>
Cc: Ferland, Henry <Ferland.Henry@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Harnisch, Will <Harnisch.Will@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

Shereen,
We should be fine with a Saudi visit (even this large size) for the week of March 6. As a reminder, it would be best for a Tuesday (3/7), Wednesday (3/9, or Thursday (3/9), and I would budget 2½ to 3½ hours for a comprehensive tour.

Cheryl or Matt,
Please see the request below.

An entourage from the Saudi Arabia Fuel Economy Lab is interested in learning about the background science/data that went into the HD-GHG Phase 2 rule. Would TCD or ASD have someone available during the March 7-9 who could provide the overview they are looking for?

Thanks, David

From: Kandil, Shereen

Sent: Wednesday, January 04, 2017 12:44 PM
To: Haugen, David <haugen.david@epa.gov>
Cc: Ferland, Henry <Ferland.Henry@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Harnisch, Will <Harnisch.Will@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: FW: توجيه إعادة: Fuel Economy lab visit (CARB)
Importance: High

Hello everyone and happy new year!

I hope you're all well. I received the note below from the Saudis interested in visiting the lab. Please let me know if the week of March 6th works for you all.

Thank you,
Shereen

Shereen Kandil
Communications Director * Public Participation Specialist * MENA Program Manager
U.S. EPA, Office of International and Tribal Affairs
202-564-6433 (office)
202-768-0511 (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide
http://www.epa.gov/international-cooperation
http://www.epa.gov/tribal

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From: Nasser Al Ghamdi [mailto:nasser.meep@gmail.com]
Sent: Thursday, December 15, 2016 3:04 AM
To: 'Kandil, Shereen' <Kandil.Shereen@epa.gov>
Cc: 'James'' <James.Jewell@hq.doe.gov>; 'Mohammad Ibrahim personal' <mohe00@yahoo.com>; 'Zahrani, Ahmed M' <Ahmed.Zahrani@mopm.gov.sa>; 'Ahmed M'' <ahmed.zahrani@mopm.gov.sa>; 'Glen'' <Glen.Sweetnam@Hq.Doe.Gov>; 'Scott Hutchins' <Scott.Hutchins@ee.doe.gov>; CarverMJ@state.gov; 'Will' <Harnisch.Will@epa.gov>; 'Josh'' <Josh.Mckearin@Hq.Doe.Gov>; 'Mohammed Albrahim' <mohe00@yahoo.com>
Subject: RE:إعادة توجيه : Fuel Economy lab visit (CARB)

Dear Shereen,

Thank you for your patience, we very much appreciate your cooperation in accommodating our request.

The team informs me that the proposed times and duration work very well for them as well,

perhaps the first week of March. The team size will be ~15 and will consist mostly of technical staff who developed the fuel economy standard for Saudi Arabia, and others who will be supervising the testing in Saudi Arabia once the fuel economy lab is completed.

I would like also to congratulate you on the finalization the 2nd phase of the Greenhouse Gas and Fuel Efficiency Standards for Heavy-Duty Trucks and vehicles (GHG), and I hope it will achieve its inspiring goals in the nearest future.

On that note, we're currently developing a regulation to mandate the utilization of aerodynamic devices on heavy-duty vehicles. We understand that EPA-GHG on its 2nd phase will enforce a similar standard on trailer and tractor. In addition, NHTSA, the EPA (Smart Way program) and CARB have a wide expertise on this subject.

We would very much appreciate scheduling another meeting with the EPA representatives during our visit on the week of March 6th to discuss the following topics, which mainly focus on the rules and guidelines of the aerodynamic part in the GHG final rule:

1- **Conditions and technical requirements.**
   - a- The methodology used to establish the tractor and trailer baselines
   - b- The methodology used to establish the tractor and trailer Bin performance levels
2- **Aerodynamic devices testing and certification**
   - a. The required documents to be submitted by the manufacturer in order to certify the aerodynamic devices
   - b. The process for verifying the submitted aerodynamic data by the agency
   - c. Labeling/identification of certified aerodynamic devices.
   - d. The criteria for using a third party test data.
3- **Aerodynamic devices verification and inspection methodology**
   - a. The inspection methodology for the aerodynamic devices to ensure that only certified devices are fitted on vehicles.
   - b. Dose EPA conducted any field inspection on a regular based.
4- **Aerodynamic devices enforcement producer**
   - a. The main locations where inspection and enforcement of the regulation are conducted
   - b. The entity/entities responsible for enforcing the regulation
   - c. Violation fines structure and amounts

Thank you for your consideration of our request, and we look forward to hearing from you soon.

Best Regards,
--
Nasser A. Al Ghamdi
Saudi Energy Efficiency Program (SEEP)
Mobile : Ex. 6 - Personal Privacy
E-mail : Ex. 6 - Personal Privacy

To: Barba, Daniel[Barba.Daniel@epa.gov]; Moskalik, Andrew[Moskalik.Andrew@epa.gov]
Cc: Imfeld, Sterling[imfeld.sterling@epa.gov]; Haugen, David[haugen.david@epa.gov]
From: Kargul, John
Sent: Tue 3/28/2017 10:01:26 PM
Subject: Manipulation of HD Truck NOx controls in Europe...
Business Agenda 032817.pdf

Here is an excerpt from the latest business report from the 21st Century Truck partnership (attached).

JJK

European truck manufacturers call for action to prevent aftermarket manipulation of NOx emissions controls

In the wake of a report by the German television station ZDF identifying widespread aftermarket manipulation of NOx emissions control technologies on trucks, the European Automobile Manufacturers' Association (ACEA) is calling for government action to preclude such manipulation. The ZDF report, based on research ZDF commissioned at the University of Heidelberg, found that some 20% of trucks operating in eastern Europe have effectively circumvented NOx reduction technology, causing around 14,000 tonnes more NOx to be emitted per year than would be the case if all trucks that say they use AdBlue were doing so. The additional 14,000 tonnes of NOx would make it twice the size of the Volkswagen "Dieselgate" scandal of 2015, noted environmental NGO T&E. ACEA issued a statement noting that European truck manufacturers have invested heavily in complex exhaust control technology that is delivering heavy-duty vehicles which meet the stringent Euro VI emission standards. ACEA now calls on the European Commission and member states to: Ban the advertising and sale of any aftermarket device (hardware or software) that can by-pass vehicle emission control systems or enable the removal of important parts of the emission control system; and apply random road-side enforcement by police who are authorized to stop and check vehicles, so that truck operators are aware that if they are caught using one of these devices they will face a substantial fine, or their vehicle will be treated in the same way as if vehicle safety systems were defective. (LINK)

From: Laughlin, Michael D. [mailto:mlaughlin@energetics.com]
Sent: Monday, March 27, 2017 4:36 PM
To: 'Allain, Marc' <marc.allain@daimler.com>; 'Anderson, David' <david.anderson@ee.doe.gov>; 'Bennett, John' <john.bennett@meritor.com>; 'Bergstrand, Rich' <rich.bergstrand@paccar.com>; 'Bima, Michael' <MICHAEL_BIMA@denso-diam.com>; 'Blubaugh, Tim' <tblubaugh@emamail.org>; 'Bobek, Kelly' <kelly.bobek@volvo.com>; 'Boeman, Ray' <boemanrg@ornl.gov>; 'Chambon, Paul H.' <chambonph@ornl.gov>; 'Cook, Anthony' <anthony.cook@navistar.com>; 'Craven, William' <william.craven@daimler.com>; 'Crenshaw, LTC Rodney' <rodney.o.crenshaw.mil@mail.mil>; 'Davidson, Diane' <davidsond@ornl.gov>; 'Deter, Dean D. ' <deterdd@ornl.gov>; 'Dorobantu, Mike' <MihaiDorobantu@eaton.com>; 'Duggal, Vinod' <vinod.k.duggal@Cummins.com>; 'Farrell, John' <John.Farrell@nrel.gov>; 'Feenstra, Paul' <paul.feenstra@paccar.com>; 'Feight, Preston' <preston.feight@paccar.com>; dawn.fenton@volvo.com; 'Fuehrer, Larry' <larry.fuehrer@baesystems.com>; 'Girbach, Jeff'

<jeffrey.girbach@daimler.com>; 'Gotthold, David W' <David.Gotthold@pnnl.gov>; 'Gravel, Roland' <roland.gravel@ee.doe.gov>; 'Haris, William' <william.g.haris.civ@mail.mil>; 'Hess, Christopher' <christopherdhess@eaton.com>; 'Hicks, Bradford' <Bradford.Hicks@Meritor.com>; 'Howden, Ken' <ken.howden@ee.doe.gov>; Ivanic, Ziga <zivanic@energetics.com>; 'Jones, Andy' <andy.jones@daimler.com>; 'Kaahaaina, Nalu' <kaahaaina1@llnl.gov>; 'Kahl, Keith' <kahlwk@ornl.gov>; 'Kahn, Bill' <bill.kahn@paccar.com>; Kargul, John <kargul.john@epa.gov>; 'Kayes, David' <david.kayes@daimler.com>; 'Keane, James C.' <James.Keane@Meritor.com>; 'Keller, Glenn' <gkeller@anl.gov>; 'Kelly, Kenneth ' <Kenneth.Kelly@nrel.gov>; 'Kempf, Richard C' <Richard.Kempf@Navistar.com>; 'Kraus, Traci' <traci.kraus@cummins.com>; 'Kwan, Quon' <quon.kwan@dot.gov>; 'LaClair, Tim' <laclairtj@ornl.gov>; 'Leicht, Phillip G.' <Phillip.Leicht@Meritor.com>; 'Lindgren, Brian' <Brian.Lindgren@PACCAR.com>; 'Loy, Luke' <luke.loy@dot.gov>; 'Lozada, Jorge' <Jorge.Lozada@PACCAR.com>; 'Lustbader, Jason' <Jason.Lustbader@nrel.gov>; 'Mclaughlin, Samuel' <samuel.mclaughlin@volvo.com>; 'Meeks, Reggie' <reginald_meeks@denso-diam.com>; 'Mehall, Mark' <mmehall@ford.com>; 'Miles, Paul' <pcmiles@sandia.gov>; Miller, Jonathan <jonathan.miller@volvo.com>; Miller, Paul <paul.r.miller@cummins.com>; Mills, Stacy <stacy.l.mills6.civ@mail.mil>; Muntean, George <George.Muntean@pnl.gov>; Nasr, Nader <nnasr@oshkoshcorp.com>; Nine, Ralph <Ralph.Nine@netl.doe.gov>; Perrot, Thomas L. <tperrot@energetics.com>; Quaranto, Jason <jason.quaranto@navistar.com>; Rinker, Michael <mike.rinker@pnnl.gov>; Rodgers, Kevin <kevin.rodgers@allisontransmission.com>; Graves, Ronald L. (gmail.com) <ronlgraves65@gmail.com>; Rosso, Joe <joseph.l.rosso@gmail.com>; Ruona, William <wruona@ford.com>; Salari, Kambiz <salari1@LLNL.GOV>; Savonen, Craig <craig.savonen@daimler.com>; Schramm, Scott <scott.w.schramm.civ@mail.mil>; Singh, Gurpreet <gurpreet.singh@ee.doe.gov>; Sisken, Kevin <kevin.sisken@daimler.com>; Slezak, Lee <Lee.Slezak@hq.doe.gov>; Sloane, Tom <Tom.Sloane@PACCAR.com>; Smith, David E. <smithde@ornl.gov>; Smith, Richard (ORNL) <smithrl4@ornl.gov>; Stork, Kevin <Kevin.Stork@EE.DOE.GOV>; Styles, Daniel <dstyles@ford.com>; Terry Levinson (idlinglady1@gmail.com) <idlinglady1@gmail.com>; Tradii, Tracey R. <Theresa.Tradii@Meritor.com>; Wagner, Robert M. <wagnerrm@ornl.gov>; Walkowicz, Kevin <Kevin.Walkowicz@nrel.gov>; Waltzer, Sam <Waltzer.Sam@epa.gov>; Yeakel, Skip <skip.yeakel@volvo.com>; Zukouski, Russell P <Russ.Zukouski@Navistar.com>
Cc: 'Preston Feight' <Preston.Feight@DAFTRUCKS.com>; 'roland.gravel@gmail.com' <roland.gravel@gmail.com>
Subject: RE: 21CTP MONTHLY CONFERENCE CALL – GOVERNMENT/INDUSTRY (Ex. 6 - Personal Privacy

Ex. 6 - Personal Privacy

Dear Colleagues: Attached please find the government-industry agenda for tomorrow's full Partnership call. As FYI, we will be using the guest speaker time slot for this meeting to discuss the progress and next steps for the roadmap. Please contact me should you have any questions.

Michael Laughlin, PMP

Program Director, Partnership Development and Market Transformation

Energetics Incorporated

7067 Columbia Gateway Drive, Suite 200

Columbia, MD 21046

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www.energetics.com

mlaughlin@energetics.com

Ex. 6 - Personal Privacy (direct)

(410) 290-0370 (main)

(410) 290-0377 (fax)

Ex. 6 - Personal Privacy (mobile)

-----Original Appointment-----
From: Laughlin, Michael D.
Sent: Thursday, December 15, 2016 5:04 PM
To: Laughlin, Michael D.; 'Allain, Marc'; 'Anderson, David'; 'Bennett, John'; 'Bergstrand, Rich'; 'Bima, Michael'; 'Blubaugh, Tim'; 'Bobek, Kelly'; 'Boeman, Ray'; 'Chambon, Paul H.'; 'Cook, Anthony'; 'Craven, William'; 'Crenshaw, LTC Rodney'; 'Davidson, Diane'; 'Deter, Dean D. '; 'Dorobantu, Mike'; 'Duggal, Vinod'; 'Farrell, John'; 'Feenstra, Paul'; 'Feight, Preston'; 'Fenton, Dawn'; 'Fuehrer, Larry'; 'Girbach, Jeff'; 'Gotthold, David W'; 'Gravel, Roland'; 'Haris, William'; 'Hess, Christopher'; 'Hicks, Bradford'; 'Howden, Ken'; Ivanic, Ziga; 'Jones, Andy'; 'Kaahaaina, Nalu'; 'Kahl, Keith'; 'Kahn, Bill'; 'Kargul, John'; 'Kayes, David'; 'Keane, James C.'; 'Keller, Glenn'; 'Kelly, Kenneth '; 'Kempf, Richard C'; 'Kraus, Traci'; 'Kwan, Quon'; 'LaClair, Tim'; 'Leicht, Phillip G.'; 'Lindgren, Brian'; 'Loy, Luke'; 'Lozada, Jorge'; 'Lustbader, Jason'; 'Mclaughlin, Samuel'; 'Meeks, Reggie'; 'Mehall, Mark'; 'Miles, Paul'; Miller, Jonathan; Miller, Paul; Mills, Stacy; Muntean, George; Nasr, Nader; Nine, Ralph; Perrot, Thomas L.; Quaranto, Jason; Rinker, Michael; Rodgers, Kevin; Graves, Ronald L. (gmail.com); Rosso, Joe; Ruona, William; Salari, Kambiz; Savonen, Craig; Schramm, Scott; Singh, Gurpreet; Sisken, Kevin; Slezak, Lee; Sloane, Tom; Smith, David E.; Smith, Richard (ORNL); Stork, Kevin; Styles, Daniel; Terry Levinson (idlinglady1@gmail.com); Tradii, Tracey R.; Wagner, Robert M.; Walkowicz, Kevin; Waltzer, Sam; Yeakel, Skip; Zukouski, Russell P
Cc: 'Preston Feight'; roland.gravel@gmail.com
Subject: 21CTP MONTHLY CONFERENCE CALL – GOVERNMENT/INDUSTRY (Ex. 6 - Personal Privacy Ex. 6 - Personal Privacy
When: Tuesday, March 28, 2017 11:00 AM-12:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Teleconference Ex. 6 - Personal Privacy passcode Ex. 6 - Personal Privacy

NOTE – Due to a schedule conflict, we are moving this meeting to Tuesday, March 28. Our apologies for any inconvenience. Please let me know if there are any questions. Thank you.

Dear Colleagues: This conference appointment is for the 1-hour government-industry portion of this month's full conference call of the 21st Century Truck Partnership. We will distribute the detailed agenda and any other resources prior to the call via a separate e-mail and will post them to the 21CTP website (www.21ctp.org) for reference. Call logistics are described below.

TELECONFERENCE NUMBER: Ex. 6 - Personal Privacy **passcode** Ex. 6 - Personal Privacy

WEB MEETING: http://vsecorp.adobeconnect.com/mar201721ctp/

GUEST SPEAKER: TBD

IN-PERSON LOCATION: Energetics Washington DC office (901 D Street SW, Suite 100)

Michael Laughlin, PMP

Program Director, Partnership Development and Market Transformation

Energetics Incorporated

7067 Columbia Gateway Drive, Suite 200

Columbia, MD 21046

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www.energetics.com

mlaughlin@energetics.com

Ex. 6 - Personal Privacy direct)

(410) 290-0370 (main)

(410) 290-0377 (fax)

Ex. 6 - Personal Privacy (mobile)

To: Haugen, David[haugen.david@epa.gov]; Brusstar, Matt[brusstar.matt@epa.gov]; Gururaja, Prashanth[Gururaja.Prashanth@epa.gov]; Steele, Lauren[steele.lauren@epa.gov]; Johnson, Dennis[Johnson.Dennis@epa.gov]; Kandil, Shereen[Kandil.Shereen@epa.gov]
Cc: Spears, Matthew[spears.matthew@epa.gov]; Jackson, Cleophas[jackson.cleophas@epa.gov]; Healy, Stephen[healy.stephen@epa.gov]; Duncan, Allen[duncan.allen@epa.gov]
From: Blubaugh, Jim
Sent: Wed 3/1/2017 8:42:33 PM
Subject: FW: Saudi Energy office visit to NVFEL March 7th
Listing of Saudi government officials.docx
Agenda_Saudi visit to NVFEL.docx

Everyone,

Looks like we are still on for the Saudi visit to NVFEL next Tuesday. Shereen, is that still the case?

Can each of you who is presenting material send along your presentations to everyone on this note so each of us have a copy? Dennis and I will be connecting via videoconference to the presentation/discussion part of the agenda.

I will plan to open the meeting (it will be a little awkward via video) but we will manage. Then, Dennis will begin the presentations with a short briefing on tech verification. Then to Prashanth and then to Lauren. Please keep each of your talks to roughly 15-20 mins as I know our guests will have questions. Matt and David will take over at 10 AM and take it from there.

Finally, since there are a number of guests, can one of you please send the visitor list to the guards desk so they are notified prior to Tuesday morning.

Thanks again to everyone for your help here.

-Jim

From: Blubaugh, Jim
Sent: Wednesday, February 22, 2017 11:44 AM
To: Haugen, David <haugen.david@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Gururaja, Prashanth <Gururaja.Prashanth@epa.gov>; Steele, Lauren <steele.lauren@epa.gov>; Kandil, Shereen <Kandil.Shereen@epa.gov>; Johnson, Dennis <Johnson.Dennis@epa.gov>
Cc: Spears, Matthew <spears.matthew@epa.gov>; Jackson, Cleophas <jackson.cleophas@epa.gov>; Healy, Stephen <healy.stephen@epa.gov>; Duncan, Allen <duncan.allen@epa.gov>
Subject: RE: Saudi Energy office visit to NVFEL March 7th

Everyone,

Update: We have a conference room reserved in the lab. The meeting will be held in lab conference rooms A&C. And, DC staff will be connected via videoconference for the general HDV GHG discussion. An updated agenda is attached.

Thanks,

Jim

From: Blubaugh, Jim
Sent: Wednesday, February 15, 2017 10:35 AM
To: Haugen, David <haugen.david@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Gururaja, Prashanth <Gururaja.Prashanth@epa.gov>; Steele, Lauren <steele.lauren@epa.gov>; Kandil, Shereen <Kandil.Shereen@epa.gov>
Cc: Spears, Matthew <spears.matthew@epa.gov>; Jackson, Cleophas <jackson.cleophas@epa.gov>; Healy, Stephen <healy.stephen@epa.gov>
Subject: Saudi Energy office visit to NVFEL March 7th

Everyone,

To date, we have confirmed the Saudi Energy Efficiency Program visit to NVFEL on March 7, 2017. I have attached a draft agenda for the half day visit as well as a list of the visitors that we expect to travel to the U.S. Also, included with the visitor listing is a reminder of the questions the Saudis have asked about our HDV GHG program to be addressed during the initial discussion period. ASD-Prashanth and CD-Lauren have the lead here.

David – your team was reserving a large conference room in the lab. Please add the room information to the agenda.

Shereen – please let everyone cc:'d here know if there are any changes/updates to this visit. And, as was mentioned in previous email traffic, we assume that your team is taking care of the Homeland Security requirements for this visit.

Thanks,

Jim

Jim Blubaugh, Director

International

Office of Transportation and Air Quality

U.S. Environmental Protection Agency

(202) 564-5403

U.S. Environmental Protection Agency
HDV GHG Regulation Discussion
& NVFEL Tour

Visit by the Saudi Energy Efficiency Program
NVFEL Conference Rooms A&C

TIME	ITEM	PRESENTER
8:30 – 10:00	HDV GHG regulation discussion - Aero Verification (Legacy Fleet) - Tractor/trailer baselines - Aero Certification	Dennis Johnson Prashanth Gururaja Lauren Steele
10:00-10:30	Effective Vehicle Emissions Testing Programs & Overview of NVFEL	David Haugen Director, TATD
10:30-12:30	Laboratory Tour (TATD)	
12:30	Adjourn	

March 7, 2017
U.S. Environmental Protection Agency
National Vehicle and Fuels Emissions Laboratory
2000 Traverwood Drive, Ann Arbor, MI

Specific questions on the HDV GHG program:

1- Conditions and technical requirements

a- The methodology used to establish the tractor and trailer baselines

b- The methodology used to establish the tractor and trailer Bin performance levels

ASD – Prashanth will present a few slides covering this topic area.

2- Aerodynamic devices testing and certification

a. Distinctions between verification, approval, and certification
b. Overview of test options
c. Device approval process (with docs including installation/maintenance)
d. Trailer cert process (with docs including sample label)
e. Obligations of third party test facilities
f. Labeling/identification of aerodynamic devices on certified trailers

CD – Lauren will present a few slides on this topic area.

3- **Aerodynamic devices verification and inspection methodology

a. The inspection methodology for the aerodynamic devices to ensure that only certified devices are fitted on vehicles?
b. Does EPA conduct any field inspections on a regular basis?

4- **Aerodynamic devices enforcement producer

a. The entity/entities responsible for enforcing the regulation
b. The main locations where inspection and enforcement of the regulation are conducted?
c. Violation fines structure and amounts

** Note: For question #3, #4, TCD/ASD/CD please just discuss more so in the abstract. No slides. These questions clearly touch on our authorities – statutory/regulatory so using that approach in responding will suffice.

To: Blubaugh, Jim[Blubaugh.Jim@epa.gov]
Cc: Haugen, David[haugen.david@epa.gov]; Bynum, Cheryl[bynum.cheryl@epa.gov]; Spears, Matthew[spears.matthew@epa.gov]; Ferland, Henry[Ferland.Henry@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Brusstar, Matt[brusstar.matt@epa.gov]; Harnisch, Will[Harnisch.Will@epa.gov]
From: Kandil, Shereen
Sent: Thur 2/9/2017 3:29:10 PM
Subject: RE: إعادة توجيه: Fuel Economy lab visit

Thanks, Jim. Would you be able to clarify your availability to share with DOE?

Yes, Will H and I will take care of the OHS Spreadsheet.

Shereen

Shereen Kandil

Communications Director * Public Participation Specialist * MENA Program Manager

U.S. EPA, Office of International and Tribal Affairs

202-564-6433 (office)

Ex. 6 - Personal Privacy (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide

http://www.epa.gov/international-cooperation

http://www.epa.gov/tribal

From: Blubaugh, Jim
Sent: Thursday, February 09, 2017 10:27 AM
To: Kandil, Shereen <Kandil.Shereen@epa.gov>
Cc: Haugen, David <haugen.david@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>; Ferland, Henry <Ferland.Henry@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Harnisch, Will <Harnisch.Will@epa.gov>
Subject: RE: إعادة توجيه: Fuel Economy lab visit

Thanks Shereen. This list of potential visitors will be very helpful to us.

We are also assuming that you will take care of the Homeland Security registration obligations for this visit per the attached spreadsheet. There is a lot of information that will need to be obtained from the visitors prior to any entry into a U.S. government facility.

Thanks again for your help.

Jim

From: Kandil, Shereen
Sent: Thursday, February 09, 2017 9:47 AM
To: Josh' <josh.mckearin@hq.doe.gov>; Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Haugen, David <haugen.david@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>; Ferland, Henry <Ferland.Henry@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Harnisch, Will <Harnisch.Will@epa.gov>
Subject: FW: إعادة توجيه: Fuel Economy lab visit (CARB)

Shereen Kandil

Communications Director * Public Participation Specialist * MENA Program Manager

U.S. EPA, Office of International and Tribal Affairs

202-564-6433 (office)

Ex. 6 - Personal Privacy (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide

http://www.epa.gov/international-cooperation

http://www.epa.gov/tribal

From: Nasser Al Ghamdi Ex. 6 - Personal Privacy
Sent: Thursday, February 09, 2017 6:21 AM
To: Kandil, Shereen <Kandil.Shereen@epa.gov>
Cc: 'James" <james.jewell@hq.doe.gov>; 'Mohammad Ibrahim personal' Ex. 6 - Personal Privacy 'Ahmed M" <ahmed.zahrani@mopm.gov.sa>; 'Glen" <glen.sweetnam@hq.doe.gov>; Scott Hutchins <Scott.Hutchins@ee.doe.gov>; carvermj@state.gov; Harnisch, Will <Harnisch.Will@epa.gov>; 'Josh" <josh.mckearin@hq.doe.gov>
Subject: RE: إعادة توجيه: Fuel Economy lab visit (CARB)

Dear Shereen,

Please find below the list of the delegation per your request:

Name	Title	Organization	Status
Mohammed Albrahim	Transportation Energy Efficiency Team Leader	Ministry of Energy, Industry and Mineral Resources	Confirmed
Naif AlHumaidhi	Transportation Energy Efficiency Expert	Saudi Energy Efficiency Center	Confirmed
Jiyad Aldossary	Heavy-duty vehicle Energy Efficiency Engineer	Saudi Energy Efficiency Center	Visa pending
Saad AlAdyan	Energy Efficiency Analyst	Saudi Energy Efficiency Center	Visa pending
Talal AlRoge	Energy Efficiency Engineer	Saudi Energy Efficiency Center	Visa pending
Fahad AlHarbi	Supervisor, Quality Assurance	Ministry of Commerce and Investment	Confirmed
	Consumer Protection Agency		
Abdullah AlDosari	Mechanical Engineer,	Ministry of Commerce and Investment	Confirmed
	Consumer Protection Agency		
Mohammed AlDhewaile	Standard Researcher	Saudi Standard, Metrology and Quality Organization	Visa Pending
Sami Mirza	Consultant	Saudi Standard, Metrology and Quality Organization	Confirmed
Jalal AlHussain	Petroleum Products Laboratory Supervisor	Saudi Standard, Metrology and Quality Organization	Confirmed
Saad AlHarbi	Valuation Dept. Manager	Saudi Customs	Confirmed
Abdulaziz AlDakkan	Energy efficiency coordinator	Saudi Customs	Visa Pending
Othman AlOthman	Engineer	Ministry of Transportation	Visa Pending
Turki AlShuaibi	Colonel	General Department of Traffic	Visa Pending
Talal AlMofiz	Colonel	General Department of Traffic	Visa Pending

Regards,

Nasser Al Ghamdi

From: Kandil, Shereen [mailto:Kandil.Shereen@epa.gov]
Sent: Wednesday, February 1, 2017 1:12 AM
To: Nasser Al Ghamdi Ex. 6 - Personal Privacy
Cc: James' <james.jewell@hq.doe.gov>; Mohammad Ibrahim personal Ex. 6 - Personal Privacy Ahmed M' <ahmed.zahrani@mopm.gov.sa>; Glen' <glen.sweetnam@hq.doe.gov>; Scott Hutchins <Scott.Hutchins@ee.doe.gov>; carvermj@state.gov; Harnisch, Will <Harnisch.Will@epa.gov>; Josh' <josh.mckearin@hq.doe.gov>
Subject: RE: إعادة توجيه: Fuel Economy lab visit (CARB)

Name, organization, title please.

Thanks

Shereen Kandil

Communications Director * Public Participation Specialist * MENA Program Manager

U.S. EPA, Office of International and Tribal Affairs

202-564-6433 (office)

Ex. 6 - Personal Privacy (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide

http://www.epa.gov/international-cooperation

http://www.epa.gov/tribal

From: Nasser Al Ghamdi Ex. 6 - Personal Privacy
Sent: Tuesday, January 31, 2017 5:04 PM
To: Kandil, Shereen <Kandil.Shereen@epa.gov>
Cc: James' <james.jewell@hq.doe.gov>; Mohammad Ibrahim personal Ex. 6 - Personal Privacy; Ahmed M' <ahmed.zahrani@mopm.gov.sa>; Glen' <glen.sweetnam@hq.doe.gov>; Scott Hutchins <Scott.Hutchins@ee.doe.gov>; carvermj@state.gov; Harnisch, Will <Harnisch.Will@epa.gov>; Josh' <josh.mckearin@hq.doe.gov>
Subject: RE: إعادة توجيه: Fuel Economy lab visit (CARB)

Shereen,

Could you please specify the required information? Or you just need the names for now?

Nasser

On Wed, Feb 1, 2017 at 12:52 AM +0300, "Kandil, Shereen" <Kandil.Shereen@epa.gov> wrote:

Hello all,

Can you please send me the list of the delegation?

Thank you,

Shereen

Shereen Kandil

Communications Director * Public Participation Specialist * MENA Program Manager

U.S. EPA, Office of International and Tribal Affairs

202-564-6433 (office)

Ex. 6 - Personal Privacy (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide

http://www.epa.gov/international-cooperation

http://www.epa.gov/tribal

From: Nasser Al Ghamdi Ex. 6 - Personal Privacy
Sent: Sunday, January 22, 2017 12:34 PM
To: Kandil, Shereen <Kandil.Shereen@epa.gov>
Cc: 'James" <James.Jewell@hq.doe.gov>; 'Mohammad Ibrahim personal' Ex. 6 - Personal Privacy 'Zahrani, Ahmed M' <Ahmed.Zahrani@mopm.gov.sa>; 'Ahmed M" <ahmed.zahrani@mopm.gov.sa>; 'Glen" <Glen.Sweetnam@Hq.Doe.Gov>; Scott Hutchins <Scott.Hutchins@ee.doe.gov>; CarverMJ@state.gov; Harnisch, Will <Harnisch.Will@epa.gov>; 'Josh" <Josh.Mckearin@Hq.Doe.Gov>; 'Mohammed Albrahim' <mohe00@yahoo.com>
Subject: RE: إعادة توجيه: Fuel Economy lab visit (CARB)

Dear Shereen,

Thank you for your patience

The team prefers to conduct the tour on Tuesday (March 7th) if that is possible. The delegation will consist of 15 members in total. I will be sending you the names in a separate email in a few days.

Best Regards,
Nasser Al Ghamdi

From: Kandil, Shereen [mailto:Kandil.Shereen@epa.gov]
Sent: Thursday, January 5, 2017 12:39 AM
To: Nasser Al Ghamdi <Ex. 6 - Personal Privacy
Cc: 'James" <James.Jewell@hq.doe.gov>; 'Mohammad Ibrahim personal' Ex. 6 - Personal Privacy 'Zahrani, Ahmed M' <Ahmed.Zahrani@mopm.gov.sa>; 'Ahmed M" <ahmed.zahrani@mopm.gov.sa>; 'Glen" <Glen.Sweetnam@Hq.Doe.Gov>; Scott Hutchins <Scott.Hutchins@ee.doe.gov>; CarverMJ@state.gov; Harnisch, Will <Harnisch.Will@epa.gov>; 'Josh" <Josh.Mckearin@Hq.Doe.Gov>; 'Mohammed Albrahim' <mohe00@yahoo.com>
Subject: RE: إعادة توجيه: Fuel Economy lab visit (CARB)

Dear Nasser,

The lab is available the week of March 6. It is best to plan for a Tuesday (3/7), Wednesday (3/9, or Thursday (3/9) visit, and they hope you would allocate 2½ to 3½ hours for a comprehensive tour.

Thank you,

Shereen

Shereen Kandil

Communications Director * Public Participation Specialist * MENA Program Manager

U.S. EPA, Office of International and Tribal Affairs

202-564-6433 (office)

Ex. 6 - Personal Privacy (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide

http://www.epa.gov/international-cooperation

http://www.epa.gov/tribal

From: Nasser Al Ghamdi Ex. 6 - Personal Privacy
Sent: Wednesday, December 14, 2016 7:04 PM
To: Kandil, Shereen <Kandil.Shereen@epa.gov>
Cc: 'James" <James.Jewell@hq.doe.gov>; 'Mohammad Ibrahim personal' Ex. 6 - Personal Privacy; 'Zahrani, Ahmed M' <Ahmed.Zahrani@mopm.gov.sa>; 'Ahmed M" <ahmed.zahrani@mopm.gov.sa>; 'Glen" <Glen.Sweetnam@Hq.Doe.Gov>; Scott Hutchins <Scott.Hutchins@ee.doe.gov>; CarverMJ@state.gov; Harnisch, Will <Harnisch.Will@epa.gov>; 'Josh" <Josh.Mckearin@Hq.Doe.Gov>; 'Mohammed Albrahim' <mohe00@yahoo.com>
Subject: RE: إعادة توجيه: Fuel Economy lab visit (CARB)

Dear Shereen,

Thank you for your patience, we very much appreciate your cooperation in accommodating our request.

The team informs me that the proposed times and duration work very well for them as well, perhaps the first week of March. The team size will be ~15 and will consist mostly of technical staff who developed the fuel economy standard for Saudi Arabia, and others who will be supervising the testing in Saudi Arabia once the fuel economy lab is completed.

I would like also to congratulate you on the finalization the 2nd phase of the Greenhouse Gas and Fuel Efficiency Standards for Heavy-Duty Trucks and vehicles (GHG), and I hope it will achieve its inspiring goals in the nearest future.

On that note, we're currently developing a regulation to mandate the utilization of aerodynamic devices on heavy-duty vehicles. We understand that EPA-GHG on its 2nd phase will enforce a similar standard on trailer and tractor. In addition, NHTSA, the EPA (Smart Way program) and CARB have a wide expertise on this subject.

We would very much appreciate scheduling another meeting with the EPA representatives during our visit on the week of March 6th to discuss the following topics, which mainly focus on the rules and guidelines of the aerodynamic part in the GHG final rule:

1- **Conditions and technical requirements.**

a- The methodology used to establish the tractor and trailer baselines

b- The methodology used to establish the tractor and trailer Bin performance levels

2- **Aerodynamic devices testing and certification**

a. The required documents to be submitted by the manufacturer in order to certify the aerodynamic devices

b. The process for verifying the submitted aerodynamic data by the agency

c. Labeling/identification of certified aerodynamic devices.

d. The criteria for using a third party test data.

3- **Aerodynamic devices verification and inspection methodology**

a. The inspection methodology for the aerodynamic devices to ensure that only certified devices are fitted on vehicles.

b. Dose EPA conducted any field inspection on a regular based.

4- **Aerodynamic devices enforcement producer**

a. The main locations where inspection and enforcement of the regulation are conducted

b. The entity/entities responsible for enforcing the regulation

c. Violation fines structure and amounts

Thank you for your consideration of our request, and we look forward to hearing from you soon.

Best Regards,

--

Nasser A. Al Ghamdi

Saudi Energy Efficiency Program (SEEP)

Mobile : Ex. 6 - Personal Privacy

E-mail : Ex. 6 - Personal Privacy

من: Kandil, Shereen [mailto:Kandil.Shereen@epa.gov]
تاريخ الإرسال: Tuesday, November 22, 2016 12:36 AM
إلى: Nasser Al Ghamdi <Ex. 6 - Personal Privacy>
نسخة: 'Jewell, James' <James.Jewell@hq.doe.gov>; 'Mohammad Ibrahim personal' <Ex. 6 - Personal Privacy>; 'Zahrani, Ahmed M' <ahmed.zahrani@mopm.gov.sa>; 'Sweetnam, Glen' <Glen.Sweetnam@Hq.Doe.Gov>; 'Dix, Daisy A' <dixda@state.gov>; Scott Hutchins <Scott.Hutchins@ee.doe.gov>; CarverMJ@state.gov; Harnisch, Will <Harnisch.Will@epa.gov>; 'McKearin, Josh' <Josh.Mckearin@Hq.Doe.Gov>
الموضوع: RE: Fuel Economy lab visit (CARB)

Dear Nasser,

The lab can certainly accommodate a visit from the Saudi team.

Best days for a visit are Tuesday, Wednesday, or Thursday; preferable between the hours of 8:30 am and 2:00 pm. The week of Feb 20th is not good, but other weeks in February or March should be fine.

The suggestion is to plan 1.5-2 hours for the discussions you've listed below. It would be a "walking and talking" tour to provide the information most effectively.

How many people from the team do you hope to have attend?

What are their backgrounds (management, facilities/construction, engineering/testing, etc), so the lab can provide the best technical information at the right level of understanding.

Thank you,

Shereen

Shereen Kandil

Communications Director * Public Participation Specialist * MENA Program Manager

U.S. EPA, Office of International and Tribal Affairs

202-564-6433 (office)

Ex. 6 - Personal Privacy (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide

http://www.epa.gov/international-cooperation

http://www.epa.gov/tribal

From: Nasser Al Ghamdi [redacted]
Sent: Thursday, November 17, 2016 6:11 PM
To: Kandil, Shereen <Kandil.Shereen@epa.gov>
Cc: 'Jewell, James' <James.Jewell@hq.doe.gov>; 'Mohammad Ibrahim personal' [redacted]; 'Zahrani, Ahmed M' <ahmed.zahrani@mopm.gov.sa>; 'Sweetnam, Glen' <Glen.Sweetnam@Hq.Doe.Gov>; 'Dix, Daisy A' <dixda@state.gov>; Scott Hutchins <Scott.Hutchins@ee.doe.gov>; CarverMJ@state.gov; Harnisch, Will <Harnisch.Will@epa.gov>; 'McKearin, Josh' <Josh.Mckearin@Hq.Doe.Gov>
Subject: RE: Fuel Economy lab visit (CARB)

Thanks for the introduction Josh.

Shereen,

The Saudi Energy Efficiency Program (SEEP) is currently enforcing the first phase of the Saudi Corporate Average Fuel Economy (CAFÉ) on the new light-duty vehicle.

The enforcement of such regulation entails the capability of testing and inspecting the actual fuel consumption of the new vehicles in accordance with EPA federal test FTP-75 and EPA federal test HWFE and other testing regulation. As probably communicated by Josh, we believe your facility is capable of this testing.

The team would very much appreciate if we can schedule a visit to your laboratory next Feb/March if possible, in order to benefit from their expertise on following subjects and mainly to attend an actual fuel economy test:

- The main apparatus used for this test: with some illustration of how each one work separately.

- The Laboratory Layout: HVAC system, insulation system, Bay area layout ... etc.

Looking forward to hearing back from you.

Best Regards,

--

Nasser A. Al Ghamdi

Saudi Energy Efficiency Program (SEEP)

Mobile : Ex. 6 - Personal Privacy

E-mail : Ex. 6 - Personal Privacy

From: McKearin, Josh [mailto:Josh.Mckearin@Hq.Doe.Gov]
Sent: Thursday, November 17, 2016 1:41 AM
To: Nasser Al Ghamdi Ex. 6 - Personal Privacy
Cc: Jewell, James <James.Jewell@hq.doe.gov>; Mohammad Ibrahim personal Ex. 6 - Personal Privacy; Zahrani, Ahmed M <ahmed.zahrani@mopm.gov.sa>; Sweetnam, Glen <Glen.Sweetnam@Hq.Doe.Gov>; Dix, Daisy A <dixda@state.gov>; Hutchins, Scott <Scott.Hutchins@ee.doe.gov>; CarverMJ@state.gov; Kandil, Shereen <Kandil.Shereen@epa.gov>; Harnisch, Will <Harnisch.Will@epa.gov>
Subject: RE: Fuel Economy lab visit (CARB)

Nasser,

In the growing CC line are colleagues from the EPA that can help facilitate a visit to the Ann Arbor, Michigan lab. I believe Shereen will be the primary point of contact.

Please keep us looped in as this progresses, and let us know if there's anything else we can help with!

Thanks,

Josh

From: Nasser Al Ghamdi Ex. 6 - Personal Privacy
Sent: Tuesday, November 15, 2016 3:19 PM
To: McKearin, Josh <Josh.Mckearin@Hq.Doe.Gov>
Cc: Jewell, James <James.Jewell@hq.doe.gov>; Mohammad Ibrahim personal Ex. 6 - Personal Privacy; Zahrani, Ahmed M <ahmed.zahrani@mopm.gov.sa>; Sweetnam, Glen <Glen.Sweetnam@Hq.Doe.Gov>; Dix, Daisy A <dixda@state.gov>
Subject: Re: Fuel Economy lab visit (CARB)

Thanks Josh

Best Regards,

Nasser Al Ghamdi

On Nov 15, 2016, at 6:14 PM, McKearin, Josh <Josh.Mckearin@Hq.Doe.Gov> wrote:

Nasser,

Have not forgotten about this item. I'm in touch with our EPA colleagues and hope to hear back from them soon on how we might make this work.

Thanks,

Josh

From: Nasser Al Ghamdi Ex. 6 - Personal Privacy
Sent: Thursday, November 10, 2016 11:54 AM
To: McKearin, Josh <Josh.Mckearin@Hq.Doe.Gov>
Cc: Jewell, James <James.Jewell@hq.doe.gov>; Mohammad Ibrahim personal Ex. 6 - Personal Privacy Zahrani, Ahmed M <ahmed.zahrani@mopm.gov.sa>;

Sweetnam, Glen <Glen.Sweetnam@Hq.Doe.Gov>; Dix, Daisy A <dixda@state.gov>
Subject: Re: Fuel Economy lab visit (CARB)

Josh,

Thank you for the follow-up on the subject.

I have spoken with SEEP's transportation team, and they are indeed interested in Fuel Economy testing. If we could arrange a visit to the US EPA Michigan testing lab in February or March, that would be great.

We very much appreciate your support on this matter.

f

Regards,

Nasser AlGhamdi

From: McKearin, Josh <josh.mckearin@hq.doe.gov>
Sent: Thursday, November 10, 2016 4:52 PM
Subject: RE: Fuel Economy lab visit (CARB)
To: Nasser Al Ghamdi Ex. 6 - Personal Privacy
Cc: Jewell, James <james.jewell@hq.doe.gov>, Mohammad Ibrahim personal Ex. 6 - Personal Privacy Zahrani, Ahmed M <ahmed.zahrani@mopm.gov.sa>, Sweetnam, Glen <glen.sweetnam@hq.doe.gov>, Dix, Daisy A <dixda@state.gov>

Nasser,

Wanted to follow up on this one. Any thoughts?

Thanks,

Josh

From: McKearin, Josh
Sent: Wednesday, November 02, 2016 4:33 PM
To: 'Nasser Al Ghamdi' Ex. 6 - Personal Privacy
Cc: Sweetnam, Glen <Glen.Sweetnam@Hq.Doe.Gov>; 'Dix, Daisy A' <DixDA@state.gov>; 'Mohammad Ibrahim personal' Ex. 6 - Personal Privacy 'Zahrani, Ahmed M' <Ahmed.Zahrani@mopm.gov.sa>; Jewell, James <James.Jewell@hq.doe.gov>
Subject: RE: Fuel Economy lab visit (CARB)

Nasser,

Hope all is well.

I made contact with ARB's Annette Hebert, but she was unsure if ARB is the entity SEEP is looking for.

She wanted me to clarify: is SEEP interested in Fuel Economy testing or tailpipe GHG emissions?

If it's Fuel Economy, she recommended talking with the USEPA (and we'd be happy to talk with them again). If it's tailpipe GHG emissions, ARB would be someone to talk with.

Can you tell me which it is?

Thanks,

Josh

From: McKearin, Josh
Sent: Wednesday, October 19, 2016 12:28 PM
To: 'Nasser Al Ghamdi' Ex. 6 - Personal Privacy
Cc: Sweetnam, Glen <Glen.Sweetnam@Hq.Doe.Gov>; 'Dix, Daisy A' <DixDA@state.gov>; 'Mohammad Ibrahim personal' Ex. 6 - Personal Privacy 'Zahrani, Ahmed M' <Ahmed.Zahrani@mopm.gov.sa>
Subject: RE: Fuel Economy lab visit (CARB)

Nasser,

Very sorry for the delay in replying. My wife and I welcomed my second daughter into the world in late September and had some unforeseen family issues to attend to in October. All is well, everyone is healthy and happy (though sleep deprived)!

I will get in touch with CARB and get back to you ASAP.

Thanks,

Josh

From: Nasser Al Ghamdi Ex. 6 - Personal Privacy
Sent: Saturday, October 01, 2016 3:36 PM
To: McKearin, Josh <Josh.Mckearin@Hq.Doe.Gov>
Cc: Sweetnam, Glen <Glen.Sweetnam@Hq.Doe.Gov>; 'Dix, Daisy A' <DixDA@state.gov>; 'Mohammad Ibrahim personal' Ex. 6 - Personal Privacy 'Zahrani, Ahmed M' <Ahmed.Zahrani@mopm.gov.sa>
Subject: Fuel Economy lab visit (CARB)

Dear Josh,

I hope this finds you well.

The transportation team in the Saudi Energy Efficiency Program (SEEP) is currently enforcing the first phase of the Saudi Corporate Average Fuel Economy (CAFÉ) on the new light-duty vehicle.

We understand that Air Resources Board (ARB) in California has been enforcing a similar regulation since 2009. The enforcement of such regulation entails the capability of testing and inspecting the actual fuel consumption of the new vehicles in accordance with EPA federal test FTP-75 and EPA federal test HWFE and other testing regulation. We believe that ARB's fuel economy testing facility in El mount, California is capable of this testing.

The team would very much appreciate if we can schedule a visit to ARB's laboratory, on**November** of this year if possible, in order to benefit from their expertise on following subjects and mainly to attend an actual fuel economy test:

- The main apparatus used for this test: with some illustration of how each one work separately.

- The Laboratory Layout: HVAC system, insulation system, Bay area layout ... etc.

We seek you support in coordinating this visit. The person we would like to ultimately contact is Ms. Annette Hebert; her contacts are below.

Ms. Annette Hebert

Chief, Emissions Compliance, Automotive Regulations & Science Division

Annette.Hebert@arb.ca.gov

Thanks in advance for your support.

Best Regards,

--

Nasser A. Al Ghamdi

Saudi Energy Efficiency Program (SEEP)

Mobile : Ex. 6 - Personal Privacy

E-mail : Ex. 6 - Personal Privacy

U.S. Environmental Protection Agency
HDV GHG Regulation Discussion
& NVFEL Tour

Visit by the Saudi Energy Efficiency Program

TIME	ITEM	PRESENTER
8:30 – 10:00	HDV GHG regulation discussion	Prashanth/Lauren/TATD
10:00-10:30	Effective Vehicle Emissions Testing Programs & Overview of NVFEL	David Haugen Director, TATD
10:30-12:30	Laboratory Tour (TATD)	
12:30	Adjourn	

March 7, 2017
U.S. Environmental Protection Agency
National Vehicle and Fuels Emissions Laboratory
2000 Traverwood Drive, Ann Arbor, MI

Specific questions on the HDV GHG program:

1- Conditions and technical requirements

a- The methodology used to establish the tractor and trailer baselines

b- The methodology used to establish the tractor and trailer Bin performance levels

ASD – Prashanth will present a few slides covering this topic area.

2- Aerodynamic devices testing and certification

a. Distinctions between verification, approval, and certification
b. Overview of test options
c. Device approval process (with docs including installation/maintenance)
d. Trailer cert process (with docs including sample label)
e. Obligations of third party test facilities
f. Labeling/identification of aerodynamic devices on certified trailers

CD – Lauren will present a few slides on this topic area.

3- **Aerodynamic devices verification and inspection methodology

a. The inspection methodology for the aerodynamic devices to ensure that only certified devices are fitted on vehicles?
b. Does EPA conduct any field inspections on a regular basis?

4- **Aerodynamic devices enforcement producer

a. The entity/entities responsible for enforcing the regulation
b. The main locations where inspection and enforcement of the regulation are conducted?
c. Violation fines structure and amounts

** Note: For question #3, #4, ASD/CD please just discuss more so in the abstract. No slides. These questions clearly touch on our authorities – statutory/regulatory so using that approach in responding will suffice.

To: Haugen, David[haugen.david@epa.gov]
From: Blubaugh, Jim
Sent: Wed 2/1/2017 4:28:35 PM
Subject: RE: إعادة توجيه: Fuel Economy lab visit (NVFEL)

Sounds good. Thanks.

From: Haugen, David
Sent: Wednesday, February 01, 2017 11:02 AM
To: Blubaugh, Jim <Blubaugh.Jim@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

This will work fine for us.

From: Blubaugh, Jim
Sent: Wednesday, February 01, 2017 10:54 AM
To: Haugen, David <haugen.david@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

Thanks David. I understand your preference to conduct a lab tour in the afternoon but I'm wondering if we can try to confine this visit to the morning. That way we would not have to deal with the whole lunch issue again. The agenda could look like the following:

8:30-10 HDV GHG regulation discussion
10-10:30 Your presentation on NVFEL (like you did during our Compliance Summit last April)
10:30- 12:30 NVFEL tour

What do you think?

-Jim

From: Haugen, David
Sent: Tuesday, January 24, 2017 4:22 PM
To: Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>
Cc: Brusstar, Matt <brusstar.matt@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

Jim,

Yes, we'll look for a room for the day (9 to 5). The Lab Tour should be allocated 2½ hours on the agenda, and is probably better on the agenda after lunch if possible.
Thanks, David

From: Blubaugh, Jim
Sent: Tuesday, January 24, 2017 2:39 PM
To: Spears, Matthew <spears.matthew@epa.gov>; Haugen, David <haugen.david@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>
Cc: Brusstar, Matt <brusstar.matt@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

Matt - Thanks for reviewing this request and offering up some ideas for coverage. I agree that Prashanth would do a great job presenting on item #1. Please go ahead and ask Prashanth to prepare. I will connect with Byron about having CD cover the other topics as well.

David - could one of your team reserve a large conference room in the lab building to host a delegation? I can't remember, is there a conference room that can host a delegation of 15+ there? We should also pull together a draft agenda - I can do that but let me know how much time you would like to utilize for the lab tour.

Thanks everyone.
Jim

From: Spears, Matthew
Sent: Tuesday, January 24, 2017 9:48 AM
To: Haugen, David <haugen.david@epa.gov>; Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>
Cc: Brusstar, Matt <brusstar.matt@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

Hi all,

This morning I spoke with Bill Charmley about this Saudi request because Bill and Kathryn Sargent had placed an all-day meeting with the CRC Board on my calendar for that day; Tuesday March 7th, from 9am-4pm. All of the ASD Center Directors have been asked to attend this CRC Board meeting at EPA in the Lobby Conference Room, and in particular Bill requested that Angela Cullen and I do attend this CRC Board meeting because of the focus on heavy-duty. Therefore, I highly doubt that I will be able to accommodate Tuesday March 7th on my calendar for briefing the Saudis.

However, I took a careful look at the Saudis' enumerated requests, and their Items 2., 3., and 4. (e.g., certification, verification, enforcement) seem to fall within the expertise and activities of OTAQ's Compliance Division. Jim, I might suggest that you reach out to Byron to see if CD could support the

Saudis' requests 2., 3., and 4. On Tuesday March 7th.

Only Item 1. seems to fall squarely within ASD's HD Phase 2 rulemaking expertise and activities (e.g., development of HD Phase 2 aerodynamic baselines and Bin determinations). For Item 1, I could ask Prashanth Gururaja on my staff to provide a presentation to the Saudis on that HD Phase 2 technical work. Prashanth was the aerodynamics team lead on HD Phase 2, and Prashanth has also chaired the Society of Automotive Engineers' Aerodynamic Coast-down Test Committee. In short, the Saudis would be in good hands with Prashanth for Item 1. Jim, would you please let me know if you agree that I should ask Prashanth to prepare a presentation to give to the Saudis on Item 1.? Thanks.

Regards,

Matthew Spears
Center Director, Heavy-Duty Diesel Standards U.S. Environmental Protection Agency
2000 Traverwood Dr.
Ann Arbor, MI 48105
spears.matthew@epa.gov
w. 734-214-4921
m. 734-276-7079

From: Haugen, David
Sent: Tuesday, January 24, 2017 9:03 AM
To: Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>
Cc: Brusstar, Matt <brusstar.matt@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

March 7th works for the Lab.
Thanks, David

From: Blubaugh, Jim
Sent: Tuesday, January 24, 2017 8:59 AM
To: Haugen, David <haugen.david@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>
Cc: Brusstar, Matt <brusstar.matt@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

Down to OTAQ only.

Before we sign up for this I wanted to make sure we are still good with hosting this delegation and also with the date of March 7th. Let me know.

Thanks,
Jim

From: Kandil, Shereen
Sent: Monday, January 23, 2017 5:26 PM
To: Haugen, David <haugen.david@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>
Cc: Ferland, Henry <Ferland.Henry@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Harnisch, Will <Harnisch.Will@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

Hello all,

The team prefers to conduct the tour on Tuesday (March 7th) if that is possible. The delegation will consist of 15 members in total. I will send you the names of the delegation once I receive them.

Thank you,
Shereen

Shereen Kandil
Communications Director * Public Participation Specialist * MENA Program Manager
U.S. EPA, Office of International and Tribal Affairs
202-564-6433 (office)
202-768-0511 (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide
http://www.epa.gov/international-cooperation
http://www.epa.gov/tribal

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From: Haugen, David
Sent: Wednesday, January 04, 2017 4:16 PM
To: Bynum, Cheryl <bynum.cheryl@epa.gov>; Kandil, Shereen <Kandil.Shereen@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>
Cc: Ferland, Henry <Ferland.Henry@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Harnisch, Will <Harnisch.Will@epa.gov>; Birgfeld, Erin

<Birgfeld.Erin@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

Shereen,
We should be fine with a Saudi visit (even this large size) for the week of March 6. As a reminder, it would be best for a Tuesday (3/7), Wednesday (3/9, or Thursday (3/9), and I would budget 2½ to 3½ hours for a comprehensive tour.

Cheryl or Matt,
Please see the request below.

An entourage from the Saudi Arabia Fuel Economy Lab is interested in learning about the background science/data that went into the HD-GHG Phase 2 rule. Would TCD or ASD have someone available during the March 7-9 who could provide the overview they are looking for?

Thanks, David

From: Kandil, Shereen
Sent: Wednesday, January 04, 2017 12:44 PM
To: Haugen, David <haugen.david@epa.gov>
Cc: Ferland, Henry <Ferland.Henry@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Harnisch, Will <Harnisch.Will@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: FW: توجيه إعادة: Fuel Economy lab visit (CARB)
Importance: High

Hello everyone and happy new year!

I hope you're all well. I received the note below from the Saudis interested in visiting the lab. Please let me know if the week of March 6th works for you all.

Thank you,
Shereen

Shereen Kandil
Communications Director * Public Participation Specialist * MENA Program Manager
U.S. EPA, Office of International and Tribal Affairs
202-564-6433 (office)
202-768-0511 (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide
http://www.epa.gov/international-cooperation
http://www.epa.gov/tribal

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From: Nasser Al Ghamdi [mailto:nasser.meep@gmail.com]
Sent: Thursday, December 15, 2016 3:04 AM
To: 'Kandil, Shereen' <Kandil.Shereen@epa.gov>
Cc: 'James'' <James.Jewell@hq.doe.gov>; 'Mohammad Ibrahim personal' <mohe00@yahoo.com>; 'Zahrani, Ahmed M' <Ahmed.Zahrani@mopm.gov.sa>; 'Ahmed M'' <ahmed.zahrani@mopm.gov.sa>; 'Glen'' <Glen.Sweetnam@Hq.Doe.Gov>; 'Scott Hutchins' <Scott.Hutchins@ee.doe.gov>; CarverMJ@state.gov; 'Will' <Harnisch.Will@epa.gov>; 'Josh'' <Josh.Mckearin@Hq.Doe.Gov>; 'Mohammed Albrahim' <mohe00@yahoo.com>
Subject: RE:إعادة توجيه : Fuel Economy lab visit (CARB)

Dear Shereen,

Thank you for your patience, we very much appreciate your cooperation in accommodating our request.

The team informs me that the proposed times and duration work very well for them as well, perhaps the first week of March. The team size will be ~15 and will consist mostly of technical staff who developed the fuel economy standard for Saudi Arabia, and others who will be supervising the testing in Saudi Arabia once the fuel economy lab is completed.

I would like also to congratulate you on the finalization the 2nd phase of the Greenhouse Gas and Fuel Efficiency Standards for Heavy-Duty Trucks and vehicles (GHG), and I hope it will achieve its inspiring goals in the nearest future.

On that note, we're currently developing a regulation to mandate the utilization of aerodynamic devices on heavy-duty vehicles. We understand that EPA-GHG on its 2nd phase will enforce a similar standard on trailer and tractor. In addition, NHTSA, the EPA (Smart Way program) and CARB have a wide expertise on this subject.

We would very much appreciate scheduling another meeting with the EPA representatives during our visit on the week of March 6th to discuss the following topics, which mainly focus on the rules and guidelines of the aerodynamic part in the GHG final rule:

1- **Conditions and technical requirements.**
    a- The methodology used to establish the tractor and trailer baselines
    b- The methodology used to establish the tractor and trailer Bin performance levels
2- **Aerodynamic devices testing and certification**
    a. The required documents to be submitted by the manufacturer in order to certify the aerodynamic devices
    b. The process for verifying the submitted aerodynamic data by the agency
    c. Labeling/identification of certified aerodynamic devices.
    d. The criteria for using a third party test data.
3- **Aerodynamic devices verification and inspection methodology**
    a. The inspection methodology for the aerodynamic devices to ensure that only

certified devices are fitted on vehicles.

b. Dose EPA conducted any field inspection on a regular based.

4- Aerodynamic devices enforcement producer

a. The main locations where inspection and enforcement of the regulation are conducted
b. The entity/entities responsible for enforcing the regulation
c. Violation fines structure and amounts

Thank you for your consideration of our request, and we look forward to hearing from you soon.

Best Regards,

--

Nasser A. Al Ghamdi
Saudi Energy Efficiency Program (SEEP)
Mobile : Ex. 6 - Personal Privacy
E-mail : Ex. 6 - Personal Privacy

To: Haugen, David[haugen.david@epa.gov]; Brusstar, Matt[brusstar.matt@epa.gov]; Barba, Daniel[Barba.Daniel@epa.gov]
From: Charmley, William
Sent: Thur 1/26/2017 7:29:42 PM
Subject: FW: ASD participation in SAE Conference in D.C. this week - and several presentation's EPA gave
2017 SAE GI Olechiw_20170125a, LD GHG overview.pdf
SAE Govt Industry 2017 Matt Spears Presentation on HD GHG and NOx.pdf
SAE GI Olechiw_20170125a, slide 4 only.ppt
2017 SAE LD Gasoline Symposium 23 January 2017 Charmley Final, Presented by Karl Simon.pdf

Dan –

I wanted to share this email with you, and the attachments, in case you wanted to share it with any of the members of your Center. While ASD had the opportunity to make several presentations this week on a few of OTAQ's programs, we could not have done the LD MTE work, or for that matter the HD Phase 2 rule, without the significant involvement of NCAT as integral members of those two teams.

I think in particular the "2017 SAE GI Olechiw .." and "2017 SAE LD Gasoline Symposium .." presentations would be of interest to NCAT.

Thanks

Bill

From: Charmley, William
Sent: Thursday, January 26, 2017 12:29 PM
To: OAR-OTAQ-ASD <OAROTAQASD@epa.gov>
Subject: ASD participation in SAE Conference in D.C. this week - and several presentation's EPA gave

Dear all –

This email is an fyi, containing information regarding some recent OTAQ/ASD activities that may be of interest to you.

In Washington this week there are two Society of Automotive Engineering (SAE) conferences which EPA participated in, and I wanted to share some information on these, and thank the many ASD staff who were involved in the planning. By far the more significant conference is the annual **SAE Government-Industry Meeting.** For this annual conference, EPA is a co-sponsor of the conference, along with SAE, and two other Federal agencies – NHTSA and DOE.

For this year's conference, several ASD staff and managers were involved in organizing or presenting on a number of panels. Specifically:

- **Houshun Zhang,** co-organizer of the session called "What's Next for Heavy Duty?"
- **Cheryl Caffery**, co-organizer of a session on Advanced Materials/Light-weighting
- **Kevin Bolon**, co-organizer of a session on Light Duty GHG/CAFE
- **Mike Safoutin**, co-organizer of a session on Electric Drive – Markets & Vehicles
- **Mike Olechiw**, presenter at the Light Duty GHG/CAFE session

- **Matt Spears**, presenter at the What's Next for Heavy Duty? session

There were also session organizers from several other Divisions in OTAQ - Aaron Sobel, Kristin Kenausis, Aaron Hula, and Paul Argyropoulos.

In addition, Karl Simon is EPA's official representative for managing this conference with SAE, and Arman Tanman is OTAQ's key person for recruiting ideas from across OTAQ and ensuring each of the session organizers have the information they need for this conference.

Also, Troy Hottle, a colleague of ours in ORD, presented on Vehicle Mass Reduction and Life Cycle Assessment. This project is one that ORD initiated several years ago at ASD's request to support the light-duty GHG mid-term evaluation project. Cheryl Caffery will send around to everyone Troy's final presentation in a few days.

I have also attached the presentations given by Mike and Matt at the conference, for those of you who are interested. Because the Power Point files are so large I converted them to PDFs, but for one of Mike's slides which has animation it ruins the whole point of the slide, so the attached power point is specifically Slide 4 of Olechiw's material. You need to open it in presenter view and wait a few seconds. It's worth the wait.

Finally, earlier in the week SAE also had a small conference on gasoline vehicle emission control technology. I was going to present the attached presentation at that conference, but due to bad weather all of the flights to DC on Monday morning were canceled. Fortunately, Karl Simon was able to fill in for me. That presentation provides information on the Tier 3 program (including early data on the gasoline sulfur compliance and MY2016 vehicle compliance), as well as an update on OTAQ's compliance activities, and a discussion of light-duty GHG topics.

To: Haugen, David[haugen.david@epa.gov]
Cc: Simpson, Krista[Simpson.Krista@epa.gov]; Brusstar, Matt[brusstar.matt@epa.gov]; Peralta, Maria[Peralta.Maria@epa.gov]
From: Derksen, Kimberly
Sent: Wed 1/25/2017 2:31:13 PM
Subject: RE: إعادة توجيه: Fuel Economy lab visit (NVFEL)

Conference rooms A & C are reserved.

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spears.matthew@epa.gov
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m. 734-276-7079

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Thank you,
Shereen

Shereen Kandil
Communications Director * Public Participation Specialist * MENA Program Manager
U.S. EPA, Office of International and Tribal Affairs
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Sent: Thursday, December 15, 2016 3:04 AM
To: 'Kandil, Shereen' <Kandil.Shereen@epa.gov>
Cc: 'James'' <James.Jewell@hq.doe.gov>; 'Mohammad Ibrahim personal' <mohe00@yahoo.com>; 'Zahrani, Ahmed M' <Ahmed.Zahrani@mopm.gov.sa>; 'Ahmed M'' <ahmed.zahrani@mopm.gov.sa>; 'Glen'' <Glen.Sweetnam@Hq.Doe.Gov>; 'Scott Hutchins' <Scott.Hutchins@ee.doe.gov>; CarverMJ@state.gov; 'Will' <Harnisch.Will@epa.gov>; 'Josh'' <Josh.Mckearin@Hq.Doe.Gov>; 'Mohammed Albrahim' <mohe00@yahoo.com>
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Saudi Energy Efficiency Program (SEEP)
Mobile : Ex. 6 - Personal Privacy
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Shereen Kandil
Communications Director * Public Participation Specialist * MENA Program Manager
U.S. EPA, Office of International and Tribal Affairs
202-564-6433 (office)
202-768-0511 (mobile)

http://www.epa.gov/international-cooperation/public-participation-guide
http://www.epa.gov/international-cooperation
http://www.epa.gov/tribal

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From: Haugen, David
Sent: Tuesday, January 24, 2017 8:27 AM
To: Kandil, Shereen <Kandil.Shereen@epa.gov>
Subject: RE: إعادة توجيه: Fuel Economy lab visit (NVFEL)

Shereen,
March 7th will work fine for the lab tour. I cannot speak for Cheryl or Matt on the HD GHG or SmartWay briefings.
Thanks, David

From: Kandil, Shereen
Sent: Monday, January 23, 2017 5:26 PM
To: Haugen, David <haugen.david@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>; Spears,

Matthew <spears.matthew@epa.gov>
Cc: Ferland, Henry <Ferland.Henry@epa.gov>; Brusstar, Matt <brusstar.matt@epa.gov>; Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Harnisch, Will <Harnisch.Will@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: RE: توجيه إعادة: Fuel Economy lab visit (NVFEL)

Hello all,

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Subject: FW: توجيه إعادة: Fuel Economy lab visit (CARB)
Importance: High

Hello everyone and happy new year!

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From: Nasser Al Ghamdi [mailto:nasser.meep@gmail.com]
Sent: Thursday, December 15, 2016 3:04 AM
To: 'Kandil, Shereen' <Kandil.Shereen@epa.gov>
Cc: 'James'' <James.Jewell@hq.doe.gov>; 'Mohammad Ibrahim personal' <mohe00@yahoo.com>; 'Zahrani, Ahmed M' <Ahmed.Zahrani@mopm.gov.sa>; 'Ahmed M'' <ahmed.zahrani@mopm.gov.sa>; 'Glen'' <Glen.Sweetnam@Hq.Doe.Gov>; 'Scott Hutchins' <Scott.Hutchins@ee.doe.gov>; CarverMJ@state.gov; 'Will' <Harnisch.Will@epa.gov>; 'Josh'' <Josh.Mckearin@Hq.Doe.Gov>;

'Mohammed Albrahim' <mohe00@yahoo.com>
Subject: RE:إعادة توجيه : Fuel Economy lab visit (CARB)

Dear Shereen,

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    a. The main locations where inspection and enforcement of the regulation are conducted
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    c. Violation fines structure and amounts

Thank you for your consideration of our request, and we look forward to hearing from you soon.

Best Regards,
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Nasser A. Al Ghamdi
Saudi Energy Efficiency Program (SEEP)
Mobile : Ex. 6 - Personal Privacy
E-mail : Ex. 6 - Personal Privacy

To: Blubaugh, Jim[Blubaugh.Jim@epa.gov]; Bynum, Cheryl[bynum.cheryl@epa.gov]; Spears, Matthew[spears.matthew@epa.gov]
Cc: Brusstar, Matt[brusstar.matt@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]
From: Haugen, David
Sent: Tue 1/24/2017 2:03:18 PM
Subject: RE: إعادة توجيه: Fuel Economy lab visit (NVFEL)

March 7th works for the Lab.
Thanks, David

From: Blubaugh, Jim
Sent: Tuesday, January 24, 2017 8:59 AM
To: Haugen, David <haugen.david@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>
Cc: Brusstar, Matt <brusstar.matt@epa.gov>; Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Subject: RE: إعادة توجيه: Fuel Economy lab visit (NVFEL)

Down to OTAQ only.

Before we sign up for this I wanted to make sure we are still good with hosting this delegation and also with the date of March 7th. Let me know.

Thanks,
Jim

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Sent: Monday, January 23, 2017 5:26 PM
To: Haugen, David <haugen.david@epa.gov>; Bynum, Cheryl <bynum.cheryl@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>
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<Birgfeld.Erin@epa.gov>
Subject: FW: توجيه إعادة: Fuel Economy lab visit (CARB)
Importance: High

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Sent: Thursday, December 15, 2016 3:04 AM
To: 'Kandil, Shereen' <Kandil.Shereen@epa.gov>
Cc: 'James'' <James.Jewell@hq.doe.gov>; 'Mohammad Ibrahim personal' <mohe00@yahoo.com>; 'Zahrani, Ahmed M' <Ahmed.Zahrani@mopm.gov.sa>; 'Ahmed M'' <ahmed.zahrani@mopm.gov.sa>; 'Glen'' <Glen.Sweetnam@Hq.Doe.Gov>; 'Scott Hutchins' <Scott.Hutchins@ee.doe.gov>; CarverMJ@state.gov; 'Will' <Harnisch.Will@epa.gov>; 'Josh'' <Josh.Mckearin@Hq.Doe.Gov>; 'Mohammed Albrahim' <mohe00@yahoo.com>
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Thank you for your consideration of our request, and we look forward to hearing from you soon.

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--

Nasser A. Al Ghamdi
Saudi Energy Efficiency Program (SEEP)
Mobile : Ex. 6 - Personal Privacy
E-mail : Ex. 6 - Personal Privacy

To: Peralta, Maria (Peralta.Maria@epa.gov)[Peralta.Maria@epa.gov]; Matt Brusstar[Brusstar.Matt@epa.gov]
Cc: Kandil, Shereen[Kandil.Shereen@epa.gov]
From: Haugen, David
Sent: Wed 1/4/2017 9:16:42 PM
Subject: FW: إعادة توجيه: Fuel Economy lab visit (NVFEL)

Maria,
I think you asked about this before the Christmas holiday. Here is the latest.
Thanks, David

From: Haugen, David
Sent: Wednesday, January 04, 2017 4:16 PM
To: Cheryl Bynum <Bynum.Cheryl@epa.gov>; Kandil, Shereen <Kandil.Shereen@epa.gov>; Spears, Matthew <spears.matthew@epa.gov>
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To: Sargeant, Kathryn[sargeant.kathryn@epa.gov]; Moltzen, Michael[Moltzen.Michael@epa.gov]; Manners, Mary[manners.mary@epa.gov]; Brusstar, Matt[brusstar.matt@epa.gov]
Cc: Cook, Leila[cook.leila@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Machiele, Paul[machiele.paul@epa.gov]; Michaels, Lauren[Michaels.Lauren@epa.gov]; Burch, Julia[Burch.Julia@epa.gov]
From: Sutton, Tia
Sent: Tue 3/21/2017 9:31:01 PM
Subject: For EPA review by 3/27 at 9am: SBA Report on Comprehensive Review of Small Business Size Standards
Size Standards Review Report to Congress.docx

Hi all,

Not sure if anyone is interested in reviewing, but passing on just in case – this is an SBA Report to Congress on a review of SBA size standards. In getting a little more intel/instructions on what we are being asked to do, this is not for us to review the size standards/their appropriateness (the new standards are already in place), this is just an opportunity to review the report itself if we so choose. I definitely plan to review (or at least skim), and will flag anything that looks like it might be of concern to us.

If you plan to review, please send me any comments that you may have by 9am on Monday the 27th, and I will compile and send one set of comments for OTAQ.

Thanks!

-Tia

From: Saltman, Tamara
Sent: Monday, March 20, 2017 3:52 PM
To: Terry, Sara <Terry.Sara@epa.gov>; Ashley, Jackie <Ashley.Jackie@epa.gov>; VonDemHagen, Rebecca <VonDemHagen.Rebecca@epa.gov>; Clarke, Deirdre <clarke.deirdre@epa.gov>; Sutton, Tia <sutton.tia@epa.gov>
Cc: Lubetsky, Jonathan <Lubetsky.Jonathan@epa.gov>
Subject: FW: TIME SENSITIVE: LRM [CIB-115-16] SBA Report on Comprehensive Review of Small Business Size Standards

This appears to be a report summarizing changes to size standards that have already been implemented (i.e. NOT an opportunity to comment on whether the standards are appropriate). Not sure anyone will have comments; on the other hand, it could be interesting for some of your folks

From: Williams, Thea
Sent: Monday, March 20, 2017 3:22 PM
To: Walsh, Ed <Walsh.Ed@epa.gov>; Saltman, Tamara <Saltman.Tamara@epa.gov>; Rogers, JoanB <Rogers.JoanB@epa.gov>; Benjamin-Sirmons, Denise <Benjamin-Sirmons.Denise@epa.gov>; Amorosi, Joanne <Amorosi.Joanne@epa.gov>; Bartlett, Keith <Bartlett.Keith@epa.gov>; Deitz, Randy <Deitz.Randy@epa.gov>; Dieu, Martin <Dieu.Martin@epa.gov>; Emmerson, Caroline <Emmerson.Caroline@epa.gov>; Fegley, Robert <Fegley.Robert@epa.gov>; Folkemer, Nathaniel <Folkemer.Nathaniel@epa.gov>; Grogard, Megan <Grogard.Megan@epa.gov>; Kelty, Diane <Kelty.Diane@epa.gov>; Kime, Robin <Kime.Robin@epa.gov>; Lagda, Jeffrey <Lagda.Jeffrey@epa.gov>; Linkins, Samantha <Linkins.Samantha@epa.gov>; Lubetsky, Jonathan <Lubetsky.Jonathan@epa.gov>; Martin, JohnC <Martin.JohnC@epa.gov>; Mojica, Andrea <Mojica.andrea@epa.gov>; Moody, Christina <Moody.Christina@epa.gov>; Niebling, William <Niebling.William@epa.gov>; Orvin, Chris <Orvin.Chris@epa.gov>; Peck, Gregory <Peck.Gregory@epa.gov>; Prabhu, Aditi <Prabhu.Aditi@epa.gov>; Schmit, Ryan <schmit.ryan@epa.gov>; Showman, John <Showman.John@epa.gov>
Cc: Moody, Christina <Moody.Christina@epa.gov>; Dickerson, Tom <Dickerson.Tom@epa.gov>; Aarons, Kyle <Aarons.Kyle@epa.gov>; Cheatham-Strickland, Latonia <Cheatham-Strickland.Latonia@epa.gov>; Richardson, RobinH <Richardson.RobinH@epa.gov>
Subject: TIME SENSITIVE: LRM [CIB-115-16] SBA Report on Comprehensive Review of Small Business Size Standards

DEADLINE: 10:00 AM Monday, March 27, 2017

Attached for your review please find a draft SBA report entitled, "The First Five-Year Comprehensive Review of Small Business Size Standards under the Small Business Jobs Act of 2010", as required by Section 1344 of the Small Business Jobs Act of 2010 (P.L. 111-240). This report provides an overview of SBA's "Size Standards Methodology," including industry and Federal contracting factors and data sources. The report also includes information on the order in which SBA reviewed size standards in various NAICS sectors, number of size standards that were reviewed and revised in each sector, size standards of high public interest and concern, and impacts of size standards revisions. Please submit any edits by the deadline.

Thanks,

Thea

Thea Williams

Office of Congressional Relations

US Environmental Protection Agency

202-564-2064

To: Birgfeld, Erin[Birgfeld.Erin@epa.gov]
Cc: Mylan, Christopher[Mylan.Christopher@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Suarez, Patricia[suarez.patricia@epa.gov]
From: Steele, Lauren
Sent: Tue 2/21/2017 1:22:14 PM
Subject: Status of the HD Trailer Fact Sheet?
Trailer fact sheet_OAR-LSedits_Clean.docx
Trailer fact sheet - OAR edits.docx

Just re-sending the files I sent on 2/7, since I haven't heard if this version is OK. As soon as you let me know if these edits are approved I will give the word for this file to be formatted in PDF for web posting.

From: Steele, Lauren
Sent: Friday, February 10, 2017 9:24 AM
To: Jennifer France <France.Jennifer@epa.gov>
Cc: David Levin <Levin.David@epa.gov>; Gwen Dietrich <Dietrich.Gwen@epa.gov>
Subject: FW: A few minor edits to the HD Trailer Fact Sheet

Jennifer,

I agreed with most of the edits I received from Erin (and John Millett) and sent a revised file Tuesday. I haven't heard yet whether this is cleared for formatting & posting. I'll keep your team in the loop if I hear anything.

Lauren

From: Steele, Lauren
Sent: Tuesday, February 07, 2017 11:12 AM
To: Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Cc: Suarez, Patricia <suarez.patricia@epa.gov>; Yanca, Catherine <yanca.catherine@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Subject: RE: A few minor edits to the HD Trailer Fact Sheet

Erin,

I have addressed the latest comments with comment balloons and redline. Also attached is a clean version in case you agree with the edits.

Lauren

From: Birgfeld, Erin
Sent: Thursday, February 02, 2017 10:56 AM
To: Steele, Lauren <steele.lauren@epa.gov>
Cc: Suarez, Patricia <suarez.patricia@epa.gov>; Yanca, Catherine <yanca.catherine@epa.gov>
Subject: RE: A few minor edits to the HD Trailer Fact Sheet

Hi Lauren,

Here is the document with the few edits in rlso I mentioned. LMK if you have questions or concerns with them. Once this is final and posted on the web, I can have John flag this for OAR. If I had to guess I'd say we could post next week.

Thanks so much!

Erin

From: Steele, Lauren
Sent: Wednesday, February 01, 2017 12:10 PM
To: Birgfeld, Erin <Birgfeld.Erin@epa.gov>
Cc: Suarez, Patricia <suarez.patricia@epa.gov>; Yanca, Catherine <yanca.catherine@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Subject: RE: A few minor edits to the HD Trailer Fact Sheet

Erin, Gwen should be sending you the file very soon. I don't know what edits John wants, but I

trust his eye.

I asked everyone in the review/concurrence chain to look at it in view of the trailer petition. One of our OTAQ-CD attorney-advisers looked at it, as well as Mark Kataoka of OGC. Mark's only question was whether it had been posted live yet.

From: Birgfeld, Erin
Sent: Wednesday, February 01, 2017 11:49 AM
To: Steele, Lauren <steele.lauren@epa.gov>
Cc: Suarez, Patricia <suarez.patricia@epa.gov>; Yanca, Catherine <yanca.catherine@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Subject: RE: A few minor edits to the HD Trailer Fact Sheet

Hi Lauren,

Another question for you… the Millett flagged this fact sheet for Sarah Dunham in the OAR front office and she had a few questions:

1) Has fact sheet had been reviewed by OGC. (I told Millett that it had.) and

2) She also wanted to confirm if OGC had reviewed in light of the suit from the trailer industry on the HD rule.

Thanks for your help here. I think we can get this posted next week if we make the requested changes (see email below) and respond to the Q's above.

Best,

Erin

From: Birgfeld, Erin
Sent: Tuesday, January 31, 2017 4:18 PM
To: Steele, Lauren <steele.lauren@epa.gov>
Cc: Suarez, Patricia <suarez.patricia@epa.gov>; Yanca, Catherine <yanca.catherine@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Subject: A few minor edits to the HD Trailer Fact Sheet

Hi Lauren,

I ran the new HD trailer FAQ fact sheet by John Millett and he had a few minor edits that he thought would help. Can you send me the word version so I can make the edits. I can also send you a pdf of his hand written edits but thought this approach may be easier.

LMK if this makes sense.

Thanks,

Erin

Erin Birgfeld

Communications Director

Office of Transportation and Air Quality

U.S. EPA

202-564-6741 (work)

202-255-4434 (cell)

Work Schedule:

8-6 M,T,Th

8-2:30 W,F

Flexiplace every Wed (call Ex. 6 - Personal Privacy to reach me on Wednesday).

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
Cc: Hengst, Benjamin[Hengst.Benjamin@epa.gov]
From: Chris Coakley
Sent: Tue 1/24/2017 9:56:54 PM
Subject: Meeting request for CEO of TOTE (Totem Ocean Trailer Express) -- 1/30 or 2/3

Good afternoon Emily,

I would like to request a meeting with Acting Assistant Administrator Chris Grundler for Anthony Chiarello, CEO of TOTE, to discuss what steps are required for TOTE's re-application to EPA for an Emissions Control Area permit under MARPOL Annex VI.

Mr. Chiarello has availability on January 30 or February 3. Please let me know if Administrator Grundler's schedule can accommodate a meeting on either day.

Thank you for considering this request.

Kind regards,

Chris

Christopher Coakley | Vice President of Government Affairs | **Saltchuk**

direct: 202.650.6910 | mobile: 202.236.0647 | fax: 202.965.1729 | ccoakley@saltchuk.com

1000 Potomac Street NW, Suite 200 | Washington, DC 20007 | www.saltchuk.com

To: Hengst, Benjamin[Hengst.Benjamin@epa.gov]
From: Blubaugh, Jim
Sent: Tue 1/24/2017 4:43:29 PM
Subject: FW: International request - NVFEL hosting a visit from the Saudis re: HD GHG program

Ben – can you stop by and fill me in? Thanks.

From: Cohen, Janet
Sent: Tuesday, January 24, 2017 11:42 AM
To: Blubaugh, Jim <Blubaugh.Jim@epa.gov>; Bunker, Byron <bunker.byron@epa.gov>
Cc: Manners, Mary <manners.mary@epa.gov>
Subject: RE: International request - NVFEL hosting a visit from the Saudis re: HD GHG program

Ex. 5 - Deliberative Process

- J. -

From: Blubaugh, Jim
Sent: Tuesday, January 24, 2017 11:41 AM
To: Bunker, Byron <bunker.byron@epa.gov>
Cc: Manners, Mary <manners.mary@epa.gov>; Cohen, Janet <cohen.janet@epa.gov>
Subject: International request - NVFEL hosting a visit from the Saudis re: HD GHG program
Importance: High

Byron,

The Saudis have contacted us regarding visiting NVFEL to talk about our HD GHG regulation and implementation/compliance program.

The visit is in the process of being confirmed for March 7th. David will be providing a tour of the lab and ASD will present on topic #1 below. Could you please assign someone from CD to present on topics #2-#4 below?

FYI – the latest incoming note from the Saudis is included below.

Thanks,

Jim

Dear Shereen,

Thank you for your patience, we very much appreciate your cooperation in accommodating our request.

The team informs me that the proposed times and duration work very well for them as well, perhaps the first week of March. The team size will be ~15 and will consist mostly of technical staff who developed the fuel economy standard for Saudi Arabia, and others who will be supervising the testing in Saudi Arabia once the fuel economy lab is completed.

I would like also to congratulate you on the finalization the 2nd phase of the Greenhouse Gas and Fuel Efficiency Standards for Heavy-Duty Trucks and vehicles (GHG), and I hope it will achieve its inspiring goals in the nearest future.

On that note, we're currently developing a regulation to mandate the utilization of aerodynamic devices on heavy-duty vehicles. We understand that EPA-GHG on its 2nd phase will enforce a similar standard on trailer and tractor. In addition, NHTSA, the EPA (Smart Way program) and CARB have a wide expertise on this subject.

We would very much appreciate scheduling another meeting with the EPA representatives during our visit on the week of March 6th to discuss the following topics, which mainly focus on the rules and guidelines of the aerodynamic part in the GHG final rule:

1- Conditions and technical requirements.

a- The methodology used to establish the tractor and trailer baselines

b- The methodology used to establish the tractor and trailer Bin performance levels

2- Aerodynamic devices testing and certification

a. The required documents to be submitted by the manufacturer in order to certify the aerodynamic devices

b. The process for verifying the submitted aerodynamic data by the agency

c. Labeling/identification of certified aerodynamic devices.

d. The criteria for using a third party test data.

3- Aerodynamic devices verification and inspection methodology

a. The inspection methodology for the aerodynamic devices to ensure that only certified devices are fitted on vehicles.

b. Dose EPA conducted any field inspection on a regular based.

4- Aerodynamic devices enforcement producer

a. The main locations where inspection and enforcement of the regulation are conducted

b. The entity/entities responsible for enforcing the regulation

c. Violation fines structure and amounts

Thank you for your consideration of our request, and we look forward to hearing from you soon.

Best Regards,

--

Nasser A. Al Ghamdi

Saudi Energy Efficiency Program (SEEP)

Mobile : Ex. 6 - Personal Privacy

E-mail : Ex. 6 - Personal Privacy

To: Niebling, William[Niebling.William@epa.gov]
Cc: Davis, Matthew[Davis.Matthew@epa.gov]; Hengst, Benjamin[Hengst.Benjamin@epa.gov]; Brown, Tristan[Brown.Tristan@epa.gov]; Haman, Patricia[Haman.Patricia@epa.gov]; Lubetsky, Jonathan[Lubetsky.Jonathan@epa.gov]
From: Sutton, Tia
Sent: Tue 1/3/2017 3:37:28 PM
Subject: FW: LD MTE QFRs- ready to go to NHTSA for review
QFRs EPA+NHTSA Responses 12-30-16_EPA-OTAQ responses to OMB comments.docx

See attached.

From: Sutton, Tia
Sent: Friday, December 30, 2016 4:17 PM
To: Davis, Matthew <Davis.Matthew@epa.gov>
Cc: Haman, Patricia <Haman.Patricia@epa.gov>
Subject: LD MTE QFRs- ready to go to NHTSA for review
Importance: High

Hey Matthew,

Attached are the QFRs with OTAQ responses to OMB/Interagency comments on the combined EPA and NHTSA document. We propose to accept all of their comments on EPA or joint responses, with a few exceptions which are flagged with comment bubbles. Also, in the EPA response to Shimkus Q1, we added a reference and link to a comprehensive table in our Proposed Determination Technical Support Document that answers the Congressman's question for EPA about numbers of current vehicles that we project already meet 2020 standards. We did not weigh in on any NHTSA-only responses, but would like to know if any aren't accepted.

So we think these are ready to go over to NHTSA for a quick look before shipping back to OMB. Once NHTSA has either accepted OMB's suggested changes to NHTSA-only responses or otherwise responded, the document should be ready to return to OMB.

Thanks, and Happy New Year!

-Tia

To: Chris Coakley[CCoakley@saltchuk.com]
From: Hengst, Benjamin
Sent: Wed 1/25/2017 4:59:00 PM
Subject: RE: Meeting request for CEO of TOTE (Totem Ocean Trailer Express) -- 1/30 or 2/3

Chris—I'm back at my desk. Sorry for all the # back-and-forth, but pls call Ex. 6 - Personal Privacy
Thanks--Ben

From: Chris Coakley [mailto:CCoakley@saltchuk.com]
Sent: Tuesday, January 24, 2017 4:57 PM
To: Atkinson, Emily <Atkinson.Emily@epa.gov>
Cc: Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Subject: Meeting request for CEO of TOTE (Totem Ocean Trailer Express) -- 1/30 or 2/3

Good afternoon Emily,

I would like to request a meeting with Acting Assistant Administrator Chris Grundler for Anthony Chiarello, CEO of TOTE, to discuss what steps are required for TOTE's re-application to EPA for an Emissions Control Area permit under MARPOL Annex VI.

Mr. Chiarello has availability on January 30 or February 3. Please let me know if Administrator Grundler's schedule can accommodate a meeting on either day.

Thank you for considering this request.

Kind regards,

Chris

Christopher Coakley | Vice President of Government Affairs | **Saltchuk**

direct: 202.650.6910 | mobile: 202.236.0647 | fax: 202.965.1729 | ccoakley@saltchuk.com

1000 Potomac Street NW, Suite 200 | Washington, DC 20007 | www.saltchuk.com

SALTCHUK

Safety
Reliability
Commitment

To: Atkinson, Emily[Atkinson.Emily@epa.gov]
Cc: Stewart, Gwen[Stewart.Gwen@epa.gov]
From: Hengst, Benjamin
Sent: Wed 1/25/2017 3:37:39 PM
Subject: RE: Meeting request for CEO of TOTE (Totem Ocean Trailer Express) -- 1/30 or 2/3

Yes—thanks. I'm talking to mr Coakley today

From: Atkinson, Emily
Sent: Wednesday, January 25, 2017 9:14 AM
To: Grundler, Christopher <grundler.christopher@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Cc: Stewart, Gwen <Stewart.Gwen@epa.gov>; Charmley, William <charmley.william@epa.gov>; Samulski, Michael <samulski.michael@epa.gov>
Subject: RE: Meeting request for CEO of TOTE (Totem Ocean Trailer Express) -- 1/30 or 2/3

Sounds like OTAQ has this covered and will schedule for Chris.

From: Grundler, Christopher
Sent: Tuesday, January 24, 2017 5:20 PM
To: Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Cc: Stewart, Gwen <Stewart.Gwen@epa.gov>; Atkinson, Emily <Atkinson.Emily@epa.gov>; Charmley, William <charmley.william@epa.gov>; Samulski, Michael <samulski.michael@epa.gov>
Subject: Re: Meeting request for CEO of TOTE (Totem Ocean Trailer Express) -- 1/30 or 2/3

Ben-

Yes, and let him know I have not changed jobs....keep Bill in the loop

Also, neither of these days am I in DC but we can arrange a call or video conference, or choose another day in that week that I am in town

Christopher Grundler, Director

Office of Transportation and Air Quality

U.S. Environmental Protection Agency

202/564-1682 (Washington DC)

734/214-4207 (Ann Arbor MI)

On Jan 24, 2017, at 5:13 PM, Hengst, Benjamin <Hengst.Benjamin@epa.gov> wrote:

Emily, Chris:

See below. Apparently Chris is now the Acting AA!

Chris—you want me to call Chris and ask what he's looking for?

From: Chris Coakley [mailto:CCoakley@saltchuk.com]
Sent: Tuesday, January 24, 2017 4:57 PM
To: Atkinson, Emily <Atkinson.Emily@epa.gov>
Cc: Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Subject: Meeting request for CEO of TOTE (Totem Ocean Trailer Express) -- 1/30 or 2/3

Good afternoon Emily,

I would like to request a meeting with Acting Assistant Administrator Chris Grundler for Anthony Chiarello, CEO of TOTE, to discuss what steps are required for TOTE's re-application to EPA for an Emissions Control Area permit under MARPOL Annex VI.

Mr. Chiarello has availability on January 30 or February 3. Please let me know if Administrator Grundler's schedule can accommodate a meeting on either day.

Thank you for considering this request.

Kind regards,

Chris

Christopher Coakley | Vice President of Government Affairs | **Saltchuk**

direct: 202.650.6910 | mobile: 202.236.0647 | fax: 202.965.1729 | ccoakley@saltchuk.com

1000 Potomac Street NW, Suite 200 | Washington, DC 20007 | www.saltchuk.com

<image002.png>

To: Orlin, David[Orlin.David@epa.gov]
From: Hengst, Benjamin
Sent: Tue 1/17/2017 3:34:38 PM
Subject: FW: Ben, racing issue, confirmation hearing?
1068.236 - Draft Race Exemption.docx

From: Moulis, Charles
Sent: Friday, January 13, 2017 3:57 PM
To: Spears, Matthew <spears.matthew@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Cc: Sutton, Tia <sutton.tia@epa.gov>
Subject: RE: Ben, racing issue, confirmation hearing?

Attached is a discussion draft reg section for a potential motor vehicle competition exemption.

Ex. 5 - Deliberative Process

From: Spears, Matthew
Sent: Friday, January 13, 2017 10:43 AM
To: Hengst, Benjamin <Hengst.Benjamin@epa.gov>
Cc: Moulis, Charles <moulis.charles@epa.gov>; Sutton, Tia <sutton.tia@epa.gov>
Subject: Ben, racing issue, confirmation hearing?

Hi Ben,

Bill, Chuck and I talked this morning about the racing issue.

Q. Is it possible for you or someone else in DC to find out if Atty Gen Pruitt will be briefed by

EPA on any issues to prepare him for his Jan 18 confirmation hearing?

Q. Why am I asking this?

Ex. 5 - Deliberative Process

to

Thanks,

Matthew Spears

Center Director, Heavy-Duty Diesel Standards U.S. Environmental Protection Agency

2000 Traverwood Dr.

Ann Arbor, MI 48105

spears.matthew@epa.gov

w. 734-214-4921

m. 734-276-7079

From: Hengst, Benjamin
Sent: Thursday, January 12, 2017 8:39 AM
To: Spears, Matthew <spears.matthew@epa.gov>; Moulis, Charles <moulis.charles@epa.gov>; Charmley, William <charmley.william@epa.gov>

Subject: Fwd: HD phase 2 litigation

FYI.

Begin forwarded message:

From: "Orlin, David" <Orlin.David@epa.gov>
Date: January 11, 2017 at 10:33:38 PM EST
To: "Hengst, Benjamin" <Hengst.Benjamin@epa.gov>
Subject: HD phase 2 litigation

Ex. 5 - Deliberative Process, Attorney Client

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

To: Argyropoulos, Paul[Argyropoulos.Paul@epa.gov]; Birgfeld, Erin[Birgfeld.Erin@epa.gov]; Jon Monger (Monger.Jon@epa.gov)[Monger.Jon@epa.gov]; Sutton, Tia[sutton.tia@epa.gov]
From: Hengst, Benjamin
Sent: Fri 1/6/2017 2:49:54 PM
Subject: trailer for 'the circle'

https://www.youtube.com/watch?v=zH0E69gtQtI

To: Grundler, Christopher[grundler.christopher@epa.gov]
Cc: Leila Cook[Cook.Leila@epa.gov]
From: Hengst, Benjamin
Sent: Mon 2/6/2017 8:35:07 PM
Subject: FW: ICYMI-- trade press article on Phase 2 HD litigation

fyi

From: Orlin, David
Sent: Monday, February 06, 2017 3:32 PM
To: Charmley, William <charmley.william@epa.gov>; Moulis, Charles <moulis.charles@epa.gov>; Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Sutton, Tia <sutton.tia@epa.gov>
Cc: Kataoka, Mark <Kataoka.Mark@epa.gov>
Subject: ICYMI-- trade press article on Phase 2 HD litigation

Below is an article from Inside EPA on the litigation on the HD rule. Has some interesting quotes from industry sources (e.g., suggesting that they expect EPA to settle with TTMA and that the OEMs might object if EPA does not then adjust the standards to reflect the CO2 reductions being foregone). Also mentions the Racing challenge and Chris' talk to SAE.

Trailer Makers Detail Narrow Challenge To EPA Heavy-Duty Truck GHG Rule

February 06, 2017

The Truck Trailer Manufacturers Association (TTMA) says it plans to challenge only the trailer-related provisions of EPA's phase two medium- and heavy-duty truck greenhouse gas rule finalized last year, rather than pursue a broad challenge to the overall rule.

The group outlines the scope of its challenge in a Feb. 2 filing responding to Jan. 23 motions by eight states and environmental groups to intervene on EPA's behalf and defend the rule. That effort appeared to be aimed at defending the trailer provisions in the event the Trump administration declines to do so, though it could also be an attempt to preserve the overall stringency of the rule if the trailer portion is removed. The court has not yet ruled on the intervenor motions.

One industry source says groups that back the rule's engine and vehicle provisions do not intend to become involved in the litigation and expect the new administration and TTMA to reach a settlement. However, that participation plan could change if the stringency of the heavy-duty truck portion of the rule is not softened to account for whatever may be lost from trailers.

TTMA says in the filing that it is not taking a position on the effort to intervene while noting it "challenges only the provisions that pertain to trailers, and trailers do not have engines." The filing notes that the challenged provisions require trailers hauled by heavy-duty tractors to have aerodynamic additions that, the group says, will achieve little if any GHG or fuel economy benefit because the added weight of the equipment would require loads to be lighter and result in the need for additional trucks to transport the same amount of goods.

"Accordingly, Movants may have no interest in, or suffer injury from, TTMA's challenge to the trailer requirements, and they have not articulated any such injury," the filing says.

One TTMA source says that the group is not concerned that separate, already-existing rules in California regulating trailers will impose two different standards because the California rule requires "the fleet to buy the equipment needed to comply and not . . . the trailer manufacturers to sell unneeded equipment."

The source adds that the group will argue that EPA lacks Clean Air Act authority to regulate trailers as a "motor vehicle" -- a longstanding claim that the Obama EPA rejected, through the Trump EPA has not weighed in on the matter.

Racing Challenge

Joining TTMA in the Dec. 28 challenge to the EPA rule is the Racing Enthusiasts & Suppliers Coalition, a group that is expected to argue that EPA's removal of language from a draft version of the rule -- which critics warned could affect amateur racers -- did not go far enough to satisfy their concerns.

Offering support to this group is Sen. Richard Burr (R-NC), who introduced Jan. 24 legislation, S. 203, to "stop EPA from cracking down on amateur race car mechanics and hobbyists." Rep. Patrick McHenry (R-NC) Jan. 6 introduced a companion version in the House, H.R. 350.

Burr's office said in a statement: "In 2015, for the first time ever, the Obama administration proposed a rule that would have enabled the EPA to fine amateur motorsports enthusiasts for converting their personal vehicles to racecars. This proposal ran counter to nearly a half century of clear congressional intent under the Clean Air Act. Thankfully, the rulemaking was removed; however, the EPA still views the practice of concerting vehicles into racecars as unlawful. The RPM Act will ensure that no administration will ever be able to overstep its regulatory powers in this area."

Lawyers representing the racing group did not respond to repeated requests for comment, so the exact scope of its challenge remains unclear. They have a Feb. 22 deadline to submit a statement of issues.

EPA last April announced that it removed the provision in the then-proposed truck rule that addressed "tampering" with vehicles and had outraged the racing enthusiasts. In a statement posted to its website, the agency said it "supports motorsports and its contributions to the American economy and communities all across the country. EPA's focus is not on vehicles built or used exclusively for racing, but on companies that don't play by the rules and that make and sell products that disable pollution controls on motor vehicles used on public roads." But nonetheless, EPA said it "has decided to eliminate the proposed language from the final rule."

The issue arose at a March 15 hearing where the Specialty Equipment Market Association raised concerns about the provision and threatened to sue EPA over it, though it did not join the litigation. EPA in a notice of data availability last year sought comment on those objections.

In response to EPA's April 15 announcement that it removed the provision, Republican Reps. Fred Upton (MI); Ed Whitfield (KY), who is now retired; and Richard Hudson (NC) said, "EPA slammed the brakes on their gambit to regulate auto racing. EPA had no business using Heavy Duty Truck rules to sideline racecars."

The industry source familiar with the rule says the racing group pursuing the litigation is an "obscure association" that does not believe EPA's fix went far enough.

The source notes that neither the racing challenge nor the trailer petition would revoke the major part of the rule, which is GHG limits from engines and vehicles. However, the source notes that if the trailer provisions are scrapped in litigation or a settlement, "the rule would become

automatically less stringent. Or . . . if you keep the overall standards in place you have to [find] those reductions somewhere else on the truck." That likely would result in the loss of widespread industry support, the source says.

The source expects EPA and TTMA to cut a deal that would give trailers more time to comply with the requirement, rather than gut the requirement entirely, though the outlines of any deal are not clear.

The source says despite the fact that the rule is largely considered to be safe from a congressional effort to revoke it, industry will actively seek to prevent the Trump EPA from gutting the rule through some "creative reachback."

Recent Meeting

Additionally, the source notes that EPA officials, including Office of Transportation & Air Quality Director Chris Grundler, were discussing the agency's light-duty vehicle and truck GHG rules at a Society of Automotive Engineering (SAE) meeting in Washington, D.C., late last month.

The source says the EPA officials gave no indication that their rules may be weakened. This was a surprise, especially for the light-duty rule given last-minute maneuvering by the Obama EPA to short circuit a mid-term review of the rule. Automakers are expected to seek weaker targets through model year 2025, the source says.

The presentations were also a surprise, according to this source, because EPA officials were said to be under a temporary gag order from the Trump administration that is intended to tweak the communication message to reflect the new administration's views.

But Grundler and others agency officials at the closed-door SAE meeting were acting like nothing had changed, the source says, adding that automakers such as Mazda, General Motors and Chrysler all gave presentations suggesting that EPA's mid-term review determination to maintain the standards was wrong.

The source was expecting the "Trump police to walk in and take [the EPA officials] away," based on their defense of the Obama rules. "It was all polite. But there are clear differences of opinion and the industry guys were saying they look forward to working with the new administration."

During a public event hosted by SAE, Grundler also largely defended EPA's mission to protect public health, while repeatedly demurring on predictions of specific agency actions. For example, asked by reporters whether or how EPA might jettison the Obama EPA's light-duty vehicle rule determination, he said, "That will be up to the new administrator." -- *Dawn Reeves* (dreeves@iwpnews.com)

David Orlin

U.S. EPA, Office of General Counsel

(202) 564-1222

To: Josh Lewis[Lewis.Josh@epa.gov]
Cc: Sutton, Tia[sutton.tia@epa.gov]; Burch, Julia[Burch.Julia@epa.gov]
From: Hengst, Benjamin
Sent: Fri 2/3/2017 7:16:58 PM
Subject: FW: LDV/HDV litigation question
Phase 2 GHG Standards Litigation update 2-2-17.docx

Josh—there's no pending litigation on light duty issues. Attached is a one-pager that OGC pulled together on HD litigation that can be given to Sarah. Thanks--Ben

From: Lewis, Josh
Sent: Wednesday, February 01, 2017 3:37 PM
To: Hengst, Benjamin <Hengst.Benjamin@epa.gov>; Sutton, Tia <sutton.tia@epa.gov>
Subject: LDV/HDV litigation question

Either of you have handy info on whether there's (1) any active litigation on LDV (related: a summary of previous major court decisions on the earlier rule); and (2) any schedule/next steps on HDV litigation (I assume it's too early…given we only recently received the two petitions for judicial review).

I can give some more background, if needed.

Josh

-2095