STAFF WORKSHOP

BEFORE THE

CALIFORNIA ENERGY RESOURCES CONSERVATION

AND DEVELOPMENT COMMISSION

In the Matter of:

FUEL EFFICIENT TIRE PROGRAM (AB-844, Statutes of 2003)) Docket No.) 07-FET-1

CALIFORNIA ENERGY COMMISSION

1516 NINTH STREET

HEARING ROOM B

SACRAMENTO, CALIFORNIA



RECD. May 01 2009

WEDNESDAY, APRIL 8, 2009

10:02 A.M.

ORIGINAL

Reported by: Peter Petty Contract No. 150-07-001 STAFF AND CONSULTANTS PRESENT

Ray Tuvell

Adam Gottlieb

Caryn Holmes

Mike Smith

ALSO PRESENT

Tracey J. Norberg, Corporate Counsel Rubber Manufacturers Association

Daniel M. Guiney Yokohama Tire Corporation

Mark E. Hawley ENVIRON Corporation

Eugene A. Petersen Consumer Reports

Tim Robinson Bridgestone Firestone North American Tire, LLC

Michael Wischhusen Michelin North America, Inc.

Alan Meier Lawrence Berkeley National Laboratory

Luke Tonachel (via teleconference) National Resource Defense

Walter H. Waddell Exxon Mobil Chemical Company

Nobuhiko Watanabe Toyo Tires Holdings of America, Inc.

Thomas Okihisa Toyo Tire (U.S.A.) Corporation

B.B. Blevins California Strategies, LLC

ALSO PRESENT

Andrew F. Burke Institute of Transportation Studies University of California Davis

Alberto C. Sumera, Jr. Yokohama Tire Corporation

Bradley J. Rump Cooper Tire and Rubber Company

Sim Ford The Goodyear Tire and Rubber Company

Megan Lloyd-Jones Edelman Public Relations

Julie Abraham Hisham Mohamed (via teleconference) Steven Wood National Highway Traffic Safety Administration U.S. Department of Transportation

Brian Callahan (via teleconference) Hankook Tire

Bob Ulrich (via teleconference) Modern Tire Dealer Magazine

Sally French (via teleconference) Integrated Waste Management Board

Randy Cooper (via teleconference) Kumbo Tire

Jim Popio (via teleconference) Smithers-Rabena Laboratory

Jennifer Tuthill (via teleconference) Natural Resources Canada

Bruce Lambillotte (via teleconference) Smithers Scientific Services

Ayana Miranda Maryland Department of the Environment

ALSO PRESENT

Mike Miguel Jessica Johnston Kamal Ahuja Mihail Cucu California Air Resources Board

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PROCEEDINGS

1 2 10:02 a.m. MR. TUVELL: I'd like to bring the 3 4 workshop to order. We have a little bit cosier 5 room for the workshop today, as opposed to our 6 main hearing room. Tracey and I were just 7 talking. Hope that increases the opportunity for 8 dialogue, in particular. But we're likely to pay a price ventilation-wise, so I want to apologize 9 10 for that ahead of time. Thank you for coming. My name is Ray 11 Tuvell. I'm the manager of the fuel efficient 12 13 tire program here at the California Energy 14 Commission. And this is one of our staff 15 workshops that we're using to try to solicit information, exchange views, perspectives, enter 16 into a dialogue to get the issues out, the 17 18 information out, the perspectives out that we can then use to move forward with developing a 19 20 consumer information program principally for fuel 21 efficient tires. And this is one in a series of 22 our workshops that we have conducted. I have a little bit of basic business to 23 take care of first. First of all, the restrooms 24 are right outside the door and to the right. 25

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First flight up there's a coffee shop if you want
 to go grab a cup of coffee, take a break of some
 sort.

We do not have scheduled breaks on the agenda, as you see, but it's obviously our intention to break at some time for lunch and then we'll kind of do that by figuring out how things go and finding the appropriate timing. But figure around 12-ish or so we'll be taking a break.

10 In the case of an emergency in the building today and the siren goes off and we need 11 to evacuate, simply follow me. We'll go out the 12 13 door and our evacuation procedure is across, 14 katty-corner to the park over there. And wait for 15 instructions to occur in coming back. Not anticipating any earthquakes or anything today, 16 guys. Those of you that are outside of 17 California. 18

We do have a very ambitious agenda today, as I hope you've seen when you picked up the material or received our notices. And so I'm looking forward to moving forward with it. And fully expect it, though, to take the entire day. And so please plan accordingly.

25 Also, let me mention that this workshop PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

is a little unique, especially for me, in that 1 ordinarily I'm responsible for pulling the 2 workshop together and the agenda and getting all 3 4 the speakers and everything going. 5 But today what we had done is we 6 provided that opportunity for the RMA and the tire 7 industry. So the agenda that you see today, and, 8 of course, I'm going to soon be handing over the mic to Tracy, is the tire industry's desire to get 9

10 this information out there. Okay.

11 So soon after my introduction I'm going 12 to hand over the mic and the orchestration of this 13 workshop to Tracey Norberg of the RMA.

Now, this being the case, and Tracey and I talked about this, we really want to encourage dialogue. And while it may seem a little bit formal in the room today, yes, I do have a court reporter, and yes, we have processes and procedures, I really want to encourage dialogue. Okay.

21 And that being the case, and Tracey and 22 I have talked about this also, please bring up 23 questions during the presentations. Don't hold it 24 all to the end, okay. That will be the most 25 useful to us.

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Now, in doing that, since we are 1 recording today, a couple things that are 2 important. Please make sure to state your name 3 4 and affiliation for the record. If you're coming 5 up to ask questions I ask you to come to the mic 6 over here at this end of the table where the two 7 gentlemen are sitting. Okay. And that will get 8 you on the record and over the speakerphone. 9 We are webcasting today. And so there 10 will be other people participating through the 11 webcast, and, of course, I'm encouraging them, just as I'm encouraging you in the room, to engage 12 13 in full participation. Okay. 14 So, what else do I have -- yeah, and of 15 course, we are transcribing the entire meeting. So following the workshop we will post on our 16 website copies of all of the presentations, plus a 17 18 transcript of the meeting today. Okay. And so that's about it for me. If 19 there's any other questions as the day goes by, 20 21 you know, just grab me, let me know. Otherwise 22 I'm going to come out in the audience and be an audience-type participator today. Little bit of a 23 different role for me. 24 25 So, Tracey, going to hand it off to you

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now. And this is Tracey Norberg from the Rubber 1 Manufacturers Association. 2 That's okay. If it's okay with you 3 4 folks -- Tracey has asked if it would be okay, 5 people would feel comfortable introducing 6 themselves for the record, as being in the meeting 7 today. 8 So, it's going to take a little bit of a parade, but if I can ask you to come up to the mic 9 10 and just introduce yourself, and affiliation, for the record. 11 And also following completing that in 12 13 the room, if I could ask for the people on WebEx 14 to also introduce themselves and their 15 affiliation, I would really appreciate that. MR. WISCHHUSEN: My name's Mike 16 17 Wischhusen representing Michelin. 18 MR. GUINEY: Dan Guiney, Yokohama Tire. MR. PETERSEN: I'm Gene Petersen with 19 Consumer Reports. 20 21 MR. WATANABE: I'm Nobuhiko Watanabe, Toyo Tires. 22 23 MR. OKIHISA: Thomas Okihisa with Toyo 24 Tires. MR. BLEVINS: B.B. Blevins with 25

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1 California Strategies.

MR. MEIER: Alan Meier, Lawrence 2 Berkeley National Lab. 3 4 MR. BURKE: Andy Burke, UC Davis, 5 Institute of Transportation Studies. 6 MR. ROBINSON: Tim Robinson, 7 Bridgestone. 8 MR. SUMERA: Albert Sumera, Yokohama 9 Tire. 10 MR. RUMP: Brad Rump, Cooper Tire. MR. FORD: Sim Ford, Goodyear Tire and 11 Rubber Company. 12 DR. HAWLEY: Mark Hawley, ENVIRON 13 14 Corporation. 15 MR. GOTTLIEB: Adam Gottlieb, Energy 16 Commission. MS. LLOYD-JONES: Megan Lloyd-Jones, 17 Edelman Public Relations. 18 MS. ABRAHAM: Julie Abraham, National 19 20 Highway Traffic Safety Administration. 21 MR. WOOD: Steven Wood, NHTSA. MS. HOLMES: Caryn Holmes, Energy 22 Commission. 23 24 DR. WADDELL: Walter Waddell, Exxon 25 Mobil.

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1	MR. TUVELL: And we've completed
2	introductions of everyone in the room. Could I
3	please ask for those of you participating on WebEx
4	to introduce yourselves, also.
5	MR. TONACHEL: Luke Tonachel from the
6	National Resource Defense Council.
7	MR. CALLAHAN: Brian Callahan, Hankook
8	Tire.
9	MR. ULRICH: Bob Ulrich, Editor of
10	Modern Tire Dealer Magazine.
11	MS. FRENCH: Sally French, Integrated
12	Waste Management Board.
13	MR. COOPER: Randy Cooper, Kumbo Tire.
14	MR. POPIO: Jim Popio, Smithers-Rabena
15	Laboratory.
16	MS. TUTHILL: Jennifer Tuthill, Natural
17	Resources Canada.
18	MR. LAMBILLOTTE: Bruce Lambillotte,
19	Smithers Scientific Services.
20	(Pause.)
21	MR. MIGUEL: Mike Miguel with the Air
22	Resources Board.
23	MS. JOHNSTON: Jessica Johnston, Air
24	Resources Board.
25	MR. AHUJA: Kamal Ahuja, ARB.

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MR. CUCU: Mihail Cucu, Air Resource 1 2 Board. MR. TUVELL: All right, thank you very 3 4 much, everyone. 5 MR. MOHAMED: Hisham Mohamed, NHTSA. 6 MS. NORBERG: Oh, more people on the 7 phone? 8 MS. MIRANDA: Ayana Miranda, Maryland Department of the Environment. 9 10 MS. NORBERG: All right. Has everybody on the phone introduced themselves at this point? 11 MR. MOHAMED: Hisham Mohamed, NHTSA. 12 13 MS. NORBERG: Last call for phone 14 participants. 15 MR. LAMBILLOTTE: Bruce Lambillotte, Smithers Scientific. 16 MS. NORBERG: Great, thank you, Bruce. 17 18 All right, good morning, everyone. And thank you for that exercise. I'm Tracey Norberg 19 20 with the Rubber Manufacturers Association. And my 21 purpose in doing that was honestly not to see how 22 well we could all cooperate to go to the microphone, although you all did very well. 23 24 I thought, especially given that this may be our last opportunity in a public forum to 25

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share information and ideas on a very important 1 topic for I think all of us in this room, it 2 seemed like it would be helpful for us to 3 4 understand who everyone is. Many of us know each 5 other, but many of us don't. And it seemed like 6 hopefully that would facilitate an open dialogue 7 as we move forward today. So, thank you for going 8 through that exercise. I appreciate it.

9 As Ray mentioned, the Rubber 10 Manufacturers Association went through the process 11 of putting together an agenda to try and address 12 all of the major issues that we see in terms of 13 developing a consumer information rating system 14 for consumers on tire efficiency.

And so on the agenda there are three speakers from the tire manufacturing industry. I would like to also point out, though, that there are additional experts from the tire industry in the audience that didn't happen to get their name next to an agenda item.

21 So we have a number of people here who 22 are truly the experts in their field, and they're 23 here as resources for all of us in discussing 24 these issues today. So, please ask questions.

If the speaker is not necessarily the

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1 appropriate person to ask a certain question, we
2 may elicit someone else's input, because we do
3 have a lot of expertise in the room. And so
4 please indulge us a little bit if we need to call
5 on someone else in the room as questions are
6 asked.

As we go through the presentations we encourage questions, especially clarification on what the speaker is talking about as the presentation is being given. And then maybe if it would help to manage the whole flow of the discussion we can have overall discussion about the presentations after the speaker's concluded.

And then it would really be helpful at the end of the day, if we can all stand it, to have an overall discussion about what all this information tells us, and open questions and next steps. So, in terms of how the process for today would work, that seems to make the most sense.

Just in terms of reviewing the agenda, first we'd like to give an overview of ISO test method. And Dan Guiney from Yokohama Tire Corporation will give that presentation.

24Then we'd like to present some data that25we have assembled looking at all of the publicly

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available data, plus some data that RMA has been
 able to collect from our members. And Dr. Mark
 Hawley will be giving that presentation. And he
 works at ENVIRON Corporation, which RMA has
 contracted with to do this expert analysis.

And then after that, after Mark has
concluded, Gene Petersen will give an overview
from the consumer's perspective. And Gene is with
Consumers Union that publishes Consumer Reports.

10 And then after Gene, we'd like to launch 11 into how do we develop a rating system, and what 12 would be helpful to consumers, given the tire 13 information and data. And Tim Robinson from 14 Bridgestone Americas will be sharing that 15 presentation with you.

16 The last, the final presentation will be 17 given by Mike Wischhusen from Michelin North 18 America. And Mike will be talking about, from the 19 tire manufacturer perspective, how can we get this 20 done. And we will share that information with you 21 last, and then, as I mentioned, we'd like to have 22 an open discussion.

Are there any questions before we get
started? Okay. Well, I'd like to introduce Dan
Guiney from Yokohama Tire Corporation.

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MR. GUINEY: Good morning, everyone.
 I'm Director of Technical Service for Yokohama
 Tire. Our headquarters is in Fullerton,
 California. So I am a native Californian, just
 wanted to let you know that.

6 What I'm going to present today is a 7 very beginning view of everything that I present. 8 And there's certainly a lot of statistic and 9 engineering behind a lot of this that I will not 10 get into.

11 If there is a need for that in going 12 forward, we would bring other people to address 13 more deeply the engineering and statistics behind 14 a lot of what's presented today.

15 So my topic is the rolling resistance 16 testing; its state of the art. An overview of ISO 17 28580, the draft international standard on rolling 18 resistance testing, and the associated uncertainty 19 analysis involved in rolling resistance testing.

The first thing I'd like to do is for everyone's benefit is to help define engineering terminology. It is a bit confusing, I will admit that. Engineers have engineer-speak. And I want to share a little engineer-speak with you, but don't hesitate to use the terms that mean

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something to you. But this can help you get at
 least a foundation in the engineering portion of
 this.

So, from the standpoint of F-sub-R, or Fr, those are the engineering terms used to describe rolling resistance force. Which is -this is the definition directly out of the SAE standard for testing of rolling resistance, so it's the exact terminology that's used in that engineering document.

11 So, rolling resistance force is rolling 12 resistance of a free-rolling tire. And it is the 13 scalar sum of all contact forces tangent to the 14 test surface, which is a road wheel, and parallel 15 to the wheel plane of the tire.

16 So if you did a force diagram, which we 17 don't have here, you would see exactly what that 18 force vector is.

19And in this presentation in other20documents you might be reading you will see RRF21referred to. So it's okay to use RRF, but it is22not the engineering term.

Another one you'll see used, an important one, is C-sub-R, or Cr, and that's rolling resistance coefficient, defined as the

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ratio of rolling resistance to the load on the tire. Also in documents you will see RRC.

Now this one's interesting because this one is truly tire energy efficiency. This one is strictly force. So in the terms of tire energy efficiency, the one that we use in the engineering world and in terms of the standards for testing, is C-sub-R. That is uniquely tire energy efficiency.

10 Okay, let's talk just a little bit about a tire's rolling resistance and what it means. 11 The tires roll under the vehicle's weight. 12 13 They're shaped as that happens, and the tire is 14 rolling through what we call the footprint or 15 contact area, the tire's being deformed. And since the tire is a viscoelastic body, as it 16 deforms it has a purpose. 17

And deformation insures traction; it insures comfort. But it also dissipates energy when it's bending, and that turns into heat. So that's where the rolling resistance force comes from. And that's where the tire rolling resistance coefficient's derived from. So in this area, in the contact area,

25 there's bending that you can see not only

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obviously in the sidewall area, but also in the
 tread area. The elements are deforming, they're
 deforming to take the aggregate of the road.
 There's a lot of bending and compression going on
 that is consuming energy.

6 So rolling resistance force is in this 7 direction. The car is say traveling in this 8 direction. You can see the F-sub-R is actually 9 resisting that and going in the opposite direction 10 of travel. So when we set tangent we mean in this 11 direction.

So tire rolling resistance is defined as 12 13 the energy dissipated by a tire per unit of 14 distance traveled, so or rolling resistance force, 15 and can be characterized in terms of efficiency as C-sub-R, the ratio of the load on the tire -- the 16 force the tire is -- the resistive force the 17 tire's generating from bending, divided by the 18 load of Y. 19

20 So the efficiency then becomes how 21 efficient is any one tire in handling the load 22 applied on the vehicle in terms of generating 23 higher or lower force.

24 So, I see some pained look on some 25 people's faces. Please, ask questions while we're

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going along, because we don't want to not be able 1 2 to answer questions. MR. TUVELL: Ray Tuvell, Energy 3 4 Commission. 5 MR. GUINEY: Sure. 6 MR. TUVELL: Dan, a couple times in your 7 presentation you were making the emphasis or the 8 point that rolling resistance coefficient of Csub-R is an energy efficiency measurement. Could 9 you clarify that? 10 MR. GUINEY: In terms of the energy 11 consumed by the tire, the tires carry load to 12 support the vehicle. So the coefficient is how 13 14 efficient in energy consumption per unit load 15 carried. MR. TUVELL: Okay. Here's the reason 16 why I ask. In fact, I have never found anywhere 17 18 in any literature that defines rolling resistance coefficient just the way you used the term. 19 20 MR. GUINEY: Other than the SAE 21 definition. And if you look at the mathematical 22 formula, the only way to explain, at least the way I explain it, is that way. 23 MR. TUVELL: Okay. But that's what I 24 wanted to clarify. I mean this is an explanation 25

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that you're using, but it is not universally 1 2 agreed or understood that rolling resistance coefficient is defined as an energy term. 3 4 MR. GUINEY: Correct. 5 MR. TUVELL: Okay, thank you. 6 MR. GUINEY: As far as my knowledge, 7 that's a true statement. 8 The measurement methods, let's go next to measurement methods for rolling resistance. We 9 list three. Commonly in the USA it's called SAE 10 J1269. It is a historical test used for many 11 years in the United States. It is a multipoint 12 13 and a single-point test. There are options within 14 the test that allow you to test at a multiple 15 group of points to do some things that are necessary at times. And there's also a single-16 point version. 17 18 It's commonly used today to characterize tires and be able to compare between tires for 19 tire energy efficiency. 20 21 Commonly used international standard is 22 ISO 18164. It is a single-point test-only. And it has been used widely globally, but not 23 24 necessarily in the United States. 25 The new test that's under development

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and shortly to be published is the ISO 28580 global. It's a global standard, as well. It's in 2 development. It is a single-point test. It is 3 4 not -- there are no multiple points tested. A 5 single appropriate point.

6 It's a new standard to be used for tire 7 characterization purposes including, it's very 8 important at this point in time, to introduce testing machine alignment. 9

10 The other procedures, the 18164 and the 1269 do not address themselves to aligning one 11 test machine to another. This is the first 12 13 procedure that I'm aware of that allows that 14 particular alignment, and we will go into it in 15 some detail.

Let's look at the actual tests a bit in 16 the next slide. Okay. Starting with 1269, again 17 18 it's a single-point test. You can see that the test drum diameter is 1.5. And the smooth or 80 19 20 grit means you can use a smooth wheel surface, 21 which is just bare steel; or you have the option 22 of putting a texturized surface on there for different engineering reasons. And both are used. 23 24 So they're both allowed.

25 The reference diameter for correcting

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all results depending on your wheel diameter is
 1.7 meters. The environment of the test is to be
 24 degrees Centigrade with some allowed variation.
 That's specified. The test speed, 80 kilometers
 per hour. The test load is defined as 70 percent
 of the maximum capacity of the tire, as defined on
 the tire sidewall.

8 Inflation pressure of the tire is both 9 regulated and it's two different -- depending on 10 whether you're dealing with a standard load tire 11 or an extra load tire, it would be different.

In case of correcting the data, once you 12 13 make a test, 1269 is corrected for the room 14 temperature. So if there is a room temperature 15 difference within the allowed range, the actual results are corrected for that. There's a 16 temperature equation that is specified in the 17 18 standard so you can correct the readings for 19 temperature.

There is no alignment procedure. So as you go across, you will see differences between the two. It's probably not that critical that we -- you can read the chart and see what the differences are, but there are differences between the tests for the purpose of

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the engineering that was designed into each test.

A couple of important points is the ISO test is corrected for temperature and drum diameter, both. So there are two corrections for the ISO test. Both of them, the long-standing ISO test and the new standard.

7 The other thing is, again, as we've said 8 before, this new draft standard ISO 28580 is the 9 first one that has the lab alignment procedure 10 included.

11 I just want to dwell a little bit on the 12 test machines because it's going to have an impact 13 later on if questions come up about how some 14 uncertainty comes about.

15 In this test machine, it's a laboratory 16 instrument, okay. It has electrical parts, it has 17 mechanical parts. It has an operator that sets it 18 up and runs it. So in terms of its operation, the 19 speed is controlled, this wheel is controlled by 20 the speed regulation of the motor.

In terms of the load applied in this direction it's controlled by a load cell, either it's actuated mechanically or hydraulically. So there's a control over this.

25 There is also, in terms of the rolling

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resistance force, either a torque cell operating on the main shaft of this wheel. There can be a force transducer on the axle, and there can also be a third variant, can't remember what it is -power, power consumption by the motor.

6 So, I just wanted to take a moment to 7 explain in any laboratory instrument there are a 8 number of different mechanical/electrical systems 9 that are being controlled to certain tolerances. 10 And there is an operator interacting with that 11 test instrument.

12 So, if you can grasp that I think you'll 13 understand better why there is some uncertainty 14 left behind at the end of this presentation.

Next slide. We said there are differences between the test procedures, so one of the questions that could come up is, well, how do we deal with numbers coming off the different tests.

The way we would deal with that is in terms of taking data from both tests and running a correlation study to see how good the correlation is, how tightly they're grouped around any given shape or form. In this case it's a straight-line fit.

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This is a correlation of the SAE 1269 1 2 test result against the 18164 ISO result. And it's for a number of different passenger size 3 4 standard load tires. So a lot of test points. 5 But you can see the correlation is quite 6 good. And in the case of where you break all 7 these down by, say, tire categories based on tire 8 size, or tire type or location, we find that if you use all of the points there's about an 18 9 percent relationship between the two tests. So 10 11 you can convert one test to the other by an 18 12 percent transformation. 13 If you break these down by say size or 14 tire tread pattern or location, then it changes a bit, but it's still -- the correlation is good and 15 it can be dealt with. It might be anywhere from 16 17 13 percent translation to a 22 percent 18 translation. 19 So I think in the engineering community we feel comfortable if we've agreed in prior 20 21 workshops to consider SAE 1269 as a measurement 22 criteria, we can transition to ISO 28580 with not 23 a -- at least at this point in time, not a great 24 concern about doing that. So we can go back and 25 forth between the two. And someday we'll

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standardize on whatever makes the most sense for the regulation.

Next slide. Okay, now I wanted to 3 4 repeat what the ISO 28580 standard is focused on, 5 and this is the cover page right from the draft 6 standard. But it is a tire rolling resistance 7 measurement method. Again, a single-point test. 8 And a measurement result correlation designed to facilitate international cooperation possibly 9 regulation building. For passenger car and 10 11 medium/heavy truck and bus tires.

12 The important thing I wanted to point 13 out is here it refers to correlation. When I go 14 into the next few slides we're going to use a word 15 that's a little easier to understand. I've said 16 it before, alignment.

Okay, so alignment is a little more comfortable term for most people in terms of how do I align with one lab to another so that I can use results from both.

21 So, if you will permit, we will talk 22 about alignment going forward. But it is 23 actually, what they're talking about is 24 correlation here.

25 Next slide. Okay, let's look at the

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alignment method now. And I will share with you 1 what is available and present -- and be able to 2 answer questions on what's on the slides. Some of 3 it, because the standard isn't published, I 4 5 couldn't just put everything up there, because 6 it's not public information. But whatever we feel 7 comfortable that can be shared, or has been shared 8 prior, we're sharing again now. 9 So, in terms of alignment the very first 10 step, and it's a very critical step and I'll explain why, is a reference lab is picked, Lab R, 11 that creates two groups of alignment tires. 12 The first criteria in the standard for 13 14 that lab is the reference lab machine 15 repeatability must be less than or equal to .05 kilograms per ton. Also the two groups picked 16 must have C-sub-R values or rolling resistance 17 18 coefficient and tire size or load index with a 19 sufficient amount of separation so that this 20 alignment is fairly stable and has a good meaning to it. 21 22 One of the things I want to point out is this is a very critical statement, that the 23 24 machine repeatability be equal to or below a specific value. 25

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What that means in engineering-speak is 1 if a machine is having repeatability issues you 2 can't go any farther. If a laboratory instrument 3 4 is demonstrating repeatability concerns above a 5 certain level everything else after that, or 6 analyzation of data after that could be coming 7 from an unstable machine. So there's really no 8 purpose in going forward.

9 This is a very critical part of the ISO 10 standard. So that's one thing you want to always 11 remember is step one is almost like a rite of 12 passage. You have to do this before you can go 13 any farther.

14 The second part of the standard comes 15 from the candidate labs, or the labs that are 16 receiving the reference tires. Could be lab A, 17 lab B, lab C, whatever. It could be a tire 18 company lab, could be a private vendor of rolling 19 resistance testing.

They receive at least two alignment tires, two groups and two tires in each group. And the repeatability test is the next thing that lab does.

24 So, not only did the reference lab have 25 to pass that standard before they did anything

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1 2 else, and establish these groups, the candidate lab has to do the same test.

In developing the standard the engineering community decided that the candidate lab must pass a standard of 0.75. So the reference lab 0.050, candidate lab .075.

Now, there was an allowance -- there's no allowance provided here if this standard isn't met. If the reference lab doesn't meet that standard they got to work on the machine. They got to figure out what is causing repeatability issues and go back and correct those until they achieve this.

14 So, the candidate lab, there was an 15 allowance added that if 0.75 is exceeded there was 16 one option put in that additional repeats can be 17 done on the reference tires, replicate testing, 18 test the same tire many times, to try to bring 19 down that variability and uncertainty around any 20 given test result.

But that's obviously done at a cost penalty for the lab. And I'm sure that while this is in there, there could be a decision made in any given lab to do what the reference lab does, and that's find the source of the repeatability issue

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and correct the electrical/mechanical issues going
 on.

3 So, once now the candidate lab has their 4 measurements completed and have passed the 5 standard, they derive a linear alignment formula 6 just in the standard formula of Y equal AX plus B. 7 In the case of each lab we're going to look at, 8 how that's done in some of the next slides.

9 Finally, the standard requires that 10 these candidate labs, once they've completed their 11 testing and they have this alignment formula, they 12 must report to their customer, whoever's asking 13 for the data, aligned results.

14 So the standard goes another step 15 forward. Even though I know the alignment, I must 16 now correct or transform my test results to 17 aligned results. So that us in the community of 18 customers can say we have some relative ground 19 here of commonality between any lab that's 20 providing the data.

Had the standard stopped short of this you wouldn't necessarily know the alignment had been applied. But it does go on and say specifically that any test results provided by this laboratory, these candidate labs, must be

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1 aligned results.

Okay, so let's get into -- oh, you know 2 what happened, Tracey? When you put the RMA 3 4 format on it moved my lines around. But that's 5 okay. 6 In your copies I hope you have -- it's a 7 shame, but anyhow, let me --8 (Parties speaking simultaneously.) 9 MR. GUINEY: -- explain what went on 10 here. I created a format without the cover text. When you slap the cover text on, it moves slides 11 around. And what happens is the nice little 12 13 graphics got messed up. But anyhow, this line, this blue line is 14 15 supposed to be right here. This blue line is supposed to be right here for a visual aid, only. 16 This red line is supposed to be here, and this red 17 18 line is supposed to be here. So what do we have now? What have we 19 20 plotted here? Okay, well, this is step one of 21 that candidate lab's responsibility. This is where the candidate lab -- and this is real data 22 done by real testing labs to the ISO 28580 23 24 standard. This is the real deal going on here. 25 This isn't hypothetical data, it's real data.

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So, the standard reference tire is 1 2 described as a rugged trail TA, that's the tire model. And that's alignment tire one. Tire paw 3 4 AWP is alignment tire two. And these are 5 different in terms of their rolling resistance 6 coefficient, as we mentioned, in terms of their 7 size tire. 8 You can see the rugged trail TA generally is in this range, and that the -- for 9 10 both labs. And that the tire paw AWP is at a lower level. 11 So let's look now at lab B and the 12 13 reference lab that created lab B's tires for an 14 example. These are the actual results. 15 So the reference lab results -- sorry, I'm shaking a bit, but that's my own hands --16 these are the three results on three tires --17 excuse me, one tire tested three times. So it's a 18 19 single tire tested three times. Rugged trail TA, one tire, three repeats of the same tire at the 20 21 reference lab. 22 This is three, the same exact three tires tested at lab B. So the tires were actually 23 24 moved between the labs and tested, the exact same tire, tested -- one tire test repeated three 25

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1 times.

2 So what you can see here, of course the 3 blue line should be here, is the different result 4 between unaligned between the two labs. What's 5 involved here is the repeatability of the machine 6 testing the same tire three times.

7 Okay, now in the case of lab H, same 8 tire model, but a different tire. This is the 9 reference lab result, and this is the candidate 10 lab result. So you can see that the disagreement 11 was in a different direction for lab H, it wasn't 12 in the same direction. So the relatively 13 alignment between the two labs is different.

Again, if you go to the second alignment tire, the reference lab is here, the candidate lab is here. So, this is their alignment difference. This is the machine variation testing one tire three times.

And I'm sorry it's covered up because everything slid around, but this is the reference lab for lab H. And they have a relatively no misalignment at all, just on the first test.

23 So now what do we do with this 24 information? Well, that's where that linear 25 alignment formula is created. So, they take --

lab B will take this result for their results, and
 they know the results from the reference lab.
 They will take this result for their result and
 they know these results from the reference lab,
 and they just do an XY fit of that data to come up
 with a linear line through those two data points.

7 So you plot the reference lab on the X 8 axis, and you plot the candidate lab on the Y 9 axis, and you just draw a best fit line through 10 them.

11 What happens is you can then come up 12 with two different parts to the formula. B is the 13 offset between the labs if the load was taken to 14 zero. A is the relative gain, or the slope of the 15 line, between the two labs. So knowing both the 16 offset and the gain, lab B can now align itself to 17 the reference lab.

So, if you have any questions about this part, this is step one, real data. The important thing to see here is the two labs testing, the test results are different. The other thing is to see that the repeatability of the machines are not exactly the same.

24Important point. The reference in all25cases, even though this amount of variability that

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you see, the reference lab must pass the same 1 2 standard. So whatever variability it was experiencing when it developed these tires, it 3 4 still passed this requirement. So its 5 repeatability was correct. 6 MR. PETERSEN: Dan, Gene Petersen with 7 Consumers Report. 8 MR. TUVELL: Gene, could I ask you to come to the speakerphone. 9 10 MR. PETERSEN: The question I have is in the selection of the tires. Of course, I think 11 you want a large enough span so you have a pretty 12 13 good correction factor or linear regression. How 14 did they go about choosing these tires? Is it as 15 a result of that span that they're looking for? Or is there some other consideration? 16 MR. GUINEY: According to the standard 17 18 it is the span. 19 MR. PETERSEN: Okav. 20 MR. GUINEY: So in the standard there's 21 not an additional prescription; it only prescribes 22 that the two tires need to be separated by a given amount of rolling resistance coefficient. 23 MR. PETERSEN: Okay. So my second 24 25 question is the tires that are tested, they must PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

fall within this span to utilize this correction? 1 MR. GUINEY: They must be at least that 2 -- it must be at least the specified distance 3 4 apart. It could be more, but it can't be less. 5 So, -- I don't have it in the 6 presentation, but I think the standard for 7 passenger is 3 kilograms per ton. 8 MR. PETERSEN: Okay. MR. GUINEY: That's the minimum distance 9 that they have to be separated by to be allowed 10 reference tires. 11 MR. PETERSEN: And while I'm up here, I 12 understand this is a proposal. 13 14 MR. GUINEY: Yes. 15 MR. PETERSEN: Is there any sense as to what stage it lies in right now? Would you know 16 about that? 17 18 MR. GUINEY: Some -- I think we're close, but I'll let somebody else answer that. 19 20 MR. ROBINSON: Yes, Tim Robinson from 21 Bridgestone. And our company is sponsoring the 22 development and supply of the ARRT tires. And to answer your question, Dan's 23 24 exactly right, the span of rolling resistance 25 coefficient will be sufficient to cover any

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foreseeable range within the market of what we see 1 now in the U.S. as far as rolling resistance 2 coefficient for force is concerned. 3 4 In addition to that, those tires are 5 also developed, so they also covered the total 6 range of load indices, the load carrying 7 capability for radial passenger car tires. 8 MR. TUVELL: Ray Tuvell with the Energy Commission. Thanks, Tim. Just for clarification 9 10 purposes, and I want you to correct me if I'm 11 wrong. So Dan has referred to the reference 12 13 tires that are specific to the 28580 protocol. 14 And the important point here is that Bridgestone 15 made specific reference tires for that purpose. MR. ROBINSON: Right. 16 MR. TUVELL: These are not just tires 17 18 pulled off the street and used. They are designed and built specifically to be reference tires for 19 20 the ISO 28580 process. 21 And so I just wanted to ask the 22 question, I believe it's understood that those tires, in fact, have been produced and are 23 24 currently available, is that correct, Tim? MR. ROBINSON: They have been produced 25

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and they will be available. We had to scale up 1 production to align with the release of the ISO 2 28580 standard. 3 4 But the other purpose of these ARRT 5 tires is to make sure that they are consistent as 6 possible. So they will be built under controlled 7 conditions such that we remove as much tire 8 variability as possible. 9 So what you'll be seeing in the lab alignment is really a test repeatability, not tire 10 variation. 11 MR. GUINEY: So, it is a little 12 13 complicated sometimes. Good point, good point, 14 Ray. 15 MR. MEIER: It's Alan Meier, Lawrence Berkeley Lab. I'm curious, what's the sigma on 16 these reference tires? I mean it was less than 17 18 that, but what was it actually? MR. GUINEY: Honestly, I don't know. 19 Ιt was not reported. But we do know that it was 20 21 below it. And when the standard's published, I'm 22 not sure what the policy is, but the research behind it, I'm not sure what happens with all of 23 24 the research behind it, all I can say is it passed 25 that standard.

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1	MR. MEIER: I'm just trying to look at
2	that range and especially the BR. Seems like it's
3	a fairly wide range.
4	MR. GUINEY: You actually have to look
5	at data and derive the data to
6	MR. MEIER: Yeah, I know. But there are
7	only three tires, so it's hard to
8	MR. GUINEY: Yeah, right, exactly.
9	MR. TUVELL: Ray Tuvell with the Energy
10	Commission. I want to make a comment, also, about
11	the sigma, the .05 and the .075 standard
12	deviation, and please clarify or correct me if I'm
13	wrong about this.
14	For passenger tires we would expect to
15	see rolling resistance coefficients in a range of
16	6 to 15, roughly, spans, rolling resistance
17	coefficients we would expect to see passenger
18	tires, all passenger tires in the current
19	marketplace falling roughly within that range, for
20	the sake of argument.
21	And that being the case, then the .05
22	that we're seeing there is an accuracy of better
23	than 1 percent. And the .075 slightly more than 1
24	percent.
25	And I just offer that explanation to put
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this in context. Those are standard deviation numbers, but we're talking about fairly accurate standard deviations here. We're down in the 1 percent range of accuracy, which is very very important to this subject.

6 MR. WISCHHUSEN: Excuse me, Mike 7 Wischhusen, Michelin. Two points. Gene asked a 8 question that didn't get answered yet. The status 9 of the ISO 28580 is nearing the final stages of 10 its approval. We anticipate final approval toward 11 October of this year. So it's on the path and 12 it's on its way.

Second point. Recall these
measurements, I believe, were they done with -- I
don't know, excuse me -- the range Ray is talking
about, the 6 to 15, those are measurements using
J1269, okay.

18 So remember Dan's slide three or four slides ago about the offset between SAE measures 19 20 and ISO measures. So that range, those numbers 21 will change. It'll be a simple offset, but it 22 won't be the number six and it won't be the number 15 when we're actually testing the 28580. 23 24 MR. GUINEY: That's correct. 25 So we -- go ahead, sure.

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MR. TUVELL: Ray Tuvell, Energy 1 Commission. I appreciate that clarification, 2 Mike. The point I was trying to use it to 3 4 illustrate that range was the level of accuracy of 5 the -- we're still talking in the 1 percent range. 6 Thank you. 7 MR. GUINEY: Yeah, that is an important 8 point. The foundation for everything we do from here on is -- oh, I'm sorry -- the foundation for 9 10 everything we do from here on out is based on meeting these requirements. Very important point. 11 So I think we can go to the next slide. 12 It's in the right place, but I know 13 Yeah. 14 something else will be out of line. But, anyhow. This now is step two. So what's 15 happened in step two? Step one we got the 16 alignment formula finished. Step two is, in the 17 18 case of the development of the standard 28580. Both lab, the reference lab H and the 19 20 candidate lab B, reference lab created eight 21 additional groups of tires in different tread 22 patterns, different load indexes, different aspect ratios, different ODs, different rim diameters, 23 24 different speed ratings, to try to get as much dispersion as possible to actually apply the 25

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1 standard across the range.

2 So these models now are three tires in each model tested once. On the reference --3 4 creating the reference line we tested one tire 5 three times. And then put a line through it to 6 come up with the alignment equation. 7 So what you're seeing here now let's 8 just talk about the A349G tire. You're seeing that lab H got a rolling resistance coefficient 9 from the three tires tested once in this range. 10 11 When the tires were shipped to lab B, they got an answer in this range. 12 So now we have eight different estimates 13 14 of how much difference there can be in between 15 machines. So we have some that have a relatively larger difference; some that have a relatively 16 smaller difference. The only thing changing, 17 since it was the same machine, is the tire sample 18 19 or population, itself. 20 So three tires in each one of these were 21 tested one time, and this is the data derived from 22 it. 23 So what you can see is that this is 24 unaligned data. We would like to be able to align this and actually bring these differences down so 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

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on a linear alignment between the two labs. What's not in here, it's important to say, this is strictly machine alignment. There is no alignment for product variation. So, if the

that lab B and lab H are on a common footing based

three different tires from this model, A349G, have
product variation. So we are not aligning product
variation. We are only aligning machine
variation. That's another important point.

10 Okay, go to the next slide. Don't hit 11 the button yet. Now, what's happened in this step 12 is we've actually taken this data from the prior 13 slide and we've applied the alignment equation to 14 it. So this is now aligned data.

So however the linear alignment formula was calculated, it's now been applied to the data, and that disagreement has been removed.

18 And what you can see is now not all the 19 lines are pointing in the same direction, which is the alignment formula at work. So, all the lines 20 21 before were going in this direction. And some 22 still do. But because of the alignment, some --23 because of the improvement in alignment, some of 24 the lines go in a different direction. So they're actually a different relationship now. 25

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But, as you can see, there is still some 1 residual misalignment. You cannot come up with, 2 in terms of an alignment method that will remove 3 4 every bit of machine alignment. But a lot of the 5 alignment was addressed. Certainly the large 6 portion of it. I think in this case, we can get 7 down to the formula here, but this residual 8 alignment or disagreement in any one tire model is 9 going to exist, even after alignment. 10 So what we have to do to get to something that we call in the engineering world as 11 the uncertainty around any given test measurement 12 13 after alignment is we take the average 14 misalignment and calculate average misalignment 15 after alignment. And that is this term in the uncertainty equation. 16 17 So the average residual misalignment in 18 all eight models is .08. I don't have up here what it was before alignment, but it was in the 19 20 neighborhood of .5. So this number, -- just under 21 .5 if I remember correctly. The alignment has 22 improved the average misalignment by a factor of five or six or seven. 23 24 The next thing you do to calculate uncertainty is you take the variability of all of 25

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these misalignments. Remember the first thing was the average misalignment. That's this number.

The second thing you do in engineering terms to calculate uncertainty is you take the variability of these alignments, that's this term, 24. That becomes the standard deviation. When you take 1.96 times the standard deviation you describe 95 percent of the population that that yariability was derived from.

10 So the total uncertainty remaining after alignment is .56. .08 of it came from the average 11 misalignment of these data points that remained 12 13 after we aligned the machines. And .24 times 1.96 14 gives us 95 percent confidence, or 95 percent of the total population of the variability of these 15 alignments. I know it's a little bit hard to 16 17 understand.

18 So the uncertainty around any given test 19 point now, or of the alignment, because lab B is 20 going to be reporting data, in this case for these 21 models tested, is .56.

How do we then evaluate for data reporting? How do we deal with this uncertainty? How can engineers deal with that remaining uncertainty?

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Well, the way we deal with it is we kind
 of look at categorizing test results, categorical
 treatment of data.

4 So what the ISO committee did was they 5 said what would be an appropriate way of defining 6 the category or bin width around which data is 7 reported, such that this uncertainty can be dealt 8 with. And while I don't present it here, you've now taken and gone to a question about is you have 9 10 this uncertainty around test data as you move closer to an upper limit or a lower limit. 11

Say a maximum bin rating, or a lower 12 13 limit bin rating, what is the risk as you approach 14 that bin width. To do that, the engineers came 15 and did studies and found out that basically when you get to a total of five sigma, two sigma was 16 used in the uncertainty analysis but when you get 17 18 to five sigma the risk associated with getting close to a bin limit, an upper limit or a lower 19 20 limit, is low enough that it's appropriate to stop 21 at five sigma.

22 So, what we do to get the total bin 23 width is we multiply this uncertainty, which is 24 .56, times 5 divided by 2. 5 sigma, but we 25 already used sigma here, so the remaining

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multiplier is 5 divided by 2. Okay. A lot of
 engineering terms.

But this ends up being the bin width. 3 4 So, .39 is, if you were going to accept, and you 5 have to accept that there's uncertainty remaining 6 in these test results, this particular testing of 7 eight models, three tires each, at two different 8 labs with say that a bin width of 1.39 kilograms 9 per ton or rolling resistance coefficient, would 10 allow you to be confident that you could contain these different ratings in bins that are this 11 wide. About 1.39. 12

So what happens is, and you can hit the -- as that bin width would move you can include different tires in the model.

16 So, for example, here now you can 17 include these two within this bin width and be 18 confident that they are in that bin.

But if you had a test result that was very close to the bin limit, the risk would go up. You could, in fact, as you get closer to the bin limit, because of the uncertainty that's there, actually have a true value that's outside the bin. So engineers use categorical information to deal with uncertainty.

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So, just to sum up, the ISO 28580 deals 1 with lab alignment. And the way it was dealt with 2 is through a linear fit. So this is aligned data, 3 4 but there is, even with that alignment we need to 5 make sure that it's recognized that there is 6 residual uncertainty around any given test result 7 from any given tire. From a machine that met the 8 limits on repeatability, from an aligned result, 9 there's still residual uncertainty. 10 You cannot be sure that any one of these test values is exactly in that point. And it's 11 described in statistics this way. At a future 12 13 meeting we could go into how this is all derived

14 and bring a much more knowledgeable person than I 15 here, how to do this. But in essence, we are 16 including a total of 5 sigma plus the average 17 misalignment that remains to get to this bin 18 width.

19 Question.

20 MR. TUVELL: Rick, Ray Tuvell with the 21 Energy Commission. Now, I'm pretty sure I don't 22 have the current draft version of 28580, and so my 23 questions are going to go to that.

The last version I had had no mention
whatsoever of anything associated with bin widths.

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MR. GUINEY: No, the standard, it does 1 not address itself. It's the derivation of the 2 standard that we needed to review these issues to 3 4 derive the standard. 5 MR. TUVELL: Okay. I just wanted to 6 clarify that. So, --7 MR. GUINEY: That's correct. 8 MR. TUVELL: -- and it's not anticipated that even in the final version of 28580 there's 9 10 going to be any mention of this subject of bin 11 width or anything of the sort? MR. GUINEY: None whatsoever. 12 13 MR. TUVELL: Okay, good. Now, let me 14 see if I understand these numbers correctly and 15 can get them in context. And I believe I do. So, the -- but please correct me, and 16 that's why I'm asking this. The 1.39 you're using 17 there is essentially a rolling resistance 18 coefficient unit. 19 20 MR. GUINEY: Exactly. 21 MR. TUVELL: Okay. And so back to my 22 comment about the range of numbers that we would 23 expect to see in passenger-type tires. Again, 24 with Mike's correction of what 28580 will do in shifting things, if I'm dealing with numbers in 25

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the 6 the lowest to 15 in the highest, that 1.39 that you're using when applied to like a 6 is talking about what, 20-plus percent variation in a tire?

5 In other words, if I measured a tire and 6 its rolling resistance coefficient turns out to be 7 around 6, you're claiming that the bin width, the 8 level of accuracy around a number like that is 9 1.39 around it, which is on the order of a 20-10 percent-plus error rate.

11 MR. GUINEY: And I mentioned something 12 that is involved that maybe isn't quite 13 understood, okay. The absolute uncertainty is 14 .56. But what the engineer needs to do is in 15 order to report any data, he needs to know the 16 risk of reporting that number associated to some 17 requirement.

18 So, to answer your question directly, 19 because, if you told the engineer, I want a tire 20 that is below 9, recognizing this uncertainty, his 21 next question would be, what is the risk that 22 you're willing to tolerate to be wrong.

23 So, added into this is this risk factor. 24 Its 1.39 includes both the absolute uncertainty 25 plus, we decided, I think it was a 5 percent risk

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is tolerable to be off of the actual limit that
 you specified.

3 So the bin has say an upper limit of, 4 let's say the bin has an upper limit of 10, down 5 to 8.5. As I'm operating in the middle of this 6 bin there's very low risk that I'm outside that 7 actual bin, that category, saying it's a 8, like a 8 one-star tire, or two-star, a three-star tire, 9 whatever number category you want to call it.

10 As you approach the limit of that 11 category the risk goes up substantially that 12 you're not in that bin anymore. So, to answer 13 your question directly, the uncertainty plus the 14 risk associated with being wrong is what derives 15 the 1.39.

MR. TUVELL: Okay. Ray Tuvell, again, 16 with the Energy Commission. Here's why I'm going 17 18 with this, Dan. You took a leap to the bin here that I'm having a hard time going to. I'm back 19 20 here with I've got a machine, either reference of a candidate machine. I ran a test tire. I came 21 22 up with a number that I then calculated as being, for the sake of argument, a 6.0 rolling resistance 23 24 coefficient.

25 Now, the level of accuracy on 28580 for PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

my candidate machine said I'm within 1 percent one 1 way or the other. Because I had the three tire 2 test repeatability that I had to prove within 1 3 4 percent. 5 So right now I know I'm within 1 6 percent. 7 MR. GUINEY: On the --8 MR. TUVELL: On the tire. 9 MR. GUINEY: On the reference tire only. 10 MR. TUVELL: Well, on the reference tire it's a .05, and so it's better than 1 percent, on 11 the reference lab. And then the candidate 12 facility it's .075. So I'm still within 1 13 14 percent. MR. GUINEY: Right. But, --15 MR. TUVELL: And so I know my machine by 16 28580 is giving me numbers that are accurate 17 18 within 1 percent. MR. GUINEY: Yes, yes, that's true. But 19 20 you also have to remember that the machine will 21 interact with any given tire that's applied to it. 22 So, in the case -- that's why we picked a broad range of rolling resistance values. We also 23 24 picked a broad range of tire types. 25 And the machine repeatability may change

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a bit depending on the tire that's applied. 1 But your statement is true. For the reference tire 2 test, for the rugged trail TA and the AWP, three 3 4 repeats on that machine, it was below that number. 5 But the machine, itself, could change, that 6 repeatability could change a bit depending on 7 which tire you put on that machine. 8 I know it's complicated, but 1 percent isn't just the -- isn't just the absolute number. 9 10 MR. TUVELL: And you're saying that this is based on three tests on the same tire that you 11 have this data? 12 MR. GUINEY: No, this is just -- no, 13 14 this is, now when we got to this chart it was 15 three tires, one test each. MR. TUVELL: Okay. So now it's becoming 16 better for me to understand. So the variability 17 18 could well be tire to tire to tire. The three tires, themselves, could be the variability not 19 20 the test machine? MR. GUINEY: Not in here. No. That 21 22 variability that you just mentioned is not included in this analysis. It's excluded from 23 24 this analysis. 25 MR. TUVELL: You see where I'm having a

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hard time with this? I mean I'm starting out with an ISO 28580 test process that basically insures 1 percent accuracy. And somehow it leapt to close to 20 percent of a problem.

5 MR. GUINEY: Yeah. And, Ray, I do fully 6 appreciate that it is somewhat hard to understand. 7 And I think our hope would be that we would have a 8 meeting on that very subject and get there.

9 MR. TUVELL: Well, yeah, I mean this is 10 important. I mean should such a problem exist, I 11 would have expected this to have been revealed in 12 the 28580 process. And I would have expected that 13 the people on the committee would say this is 14 unacceptable, to stop at this point, we need to 15 hone this down.

MR. GUINEY: The purpose of the 16 17 committee was to establish a test standard, not how to apply the test standard to produce ratings. 18 That's what we're getting into now. How do you 19 20 take a test standard and apply it meaningfully to 21 a rating system. That's not up to ISO 28580. 22 It's up to another -- this community or group, whatever we're going to do. 23

24 MR. TUVELL: Well, maybe that's the 25 clarification then that I have to hear. I thought

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to talk about the accuracy of the testing process. MR. GUINEY: And it does, yes, that's true. MR. TUVELL: Okay, but I think what I'm hearing you saying is now you're taking the leap on this slide to applying it to creating a bin system. And that's where, I think, we're -- my confusion is arising. MR. WISCHHUSEN: Can I have the mic? Mike Wischhusen, Michelin. A couple points. We got to remember what a standard is. I mean Dan said a standard sets a test procedure. A standard does not create a measurement system for a regulation. I mean let's remember what 28580 is. 28580 gives us a tool from which we can create a regulation. Okay. That's the role that the ISO standard plays. Now, part of your issue, you're jumping from what you're perceiving as a 1 percent

that your presentation was specifically designed

22 tolerance or error band around an individual 23 measurement. This is addressing measurements on 24 two different machines in two different 25 laboratories. Okay. And I mean, that's just a

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fact of life. Two different machines don't
 measure the same number.

3 So what this analysis is addressing is 4 how we, as users of the standard, now have to take 5 into account the fact that those two laboratories 6 don't measure the same number. I mean that's what 7 we're doing.

8 It's also an error to look at that 139 9 as an error, or an inaccuracy in the system. It's 10 simply a statement of fact. It's a probability, 11 you know, how sure am I that the number I state is 12 the actual measurement, okay.

13 So, even -- forget the concept of bins, 14 okay. If you report a 6.0, okay, that 1.39 is 15 then a measure of a certainty you have that 6.0 is 16 the correct number. It doesn't say your number is 17 between 4.6 and 7.4. That's not what that number 18 says. It's not an error band.

19 MR. GUINEY: And let me repeat what it 20 does relate to. The uncertainty around any given 21 test result on this, the residual uncertainty 22 around any given test result on this chart, at a 23 95 percent confidence limit, 5 percent chance of 24 being wrong, is .56.

25 But, when you ask the engineer the PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

question is how certain are you where it is in
 relation to some type of a standard or a rating,
 he has to add in the risk with which you could be
 wrong on top of this.

5 That's where we went from 2 sigma to 5 6 sigma. To lower the risk to an acceptable level 7 such that when I report my rating, not the actual 8 test result, the only way I can deal with all this 9 uncertainty and risk is to give you where I think 10 it lies with a 5 percent chance of being wrong.

11 So, that's where this concept of -- you 12 got to deal with it categorically. You cannot 13 easily deal with it numerically. You have to deal 14 with it categorically because of these issues, 15 which are real issues, in being wrong with what 16 you told someone.

17 MR. TONACHEL: This is Luke Tonachel 18 from NRDC. I wondered if I could go back to Mike 19 Wischhusen's comment, that, Mike, if you could 20 just help me understand.

You mentioned that 1.39 doesn't mean, it's not an error band. If you could provide sort of an interpretation of what that 1.39 means? MR. WISCHHUSEN: Yeah, I'm probably the wrong person to do that. I think, you know, we --

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let's do a little bit of a sanity check here,
 okay.

3 We're not statisticians, okay. The 4 statisticians did this work. I just have the 5 feeling we're spinning our wheels by questioning 6 the statisticians' work, okay.

7 But, I mean anybody who has any 8 experience with laboratory measurements, technical 9 measurements, scientific measurements, you know, 10 the concept of uncertainty is there. I mean you 11 simply cannot say I measured 6, therefore it is 6. I mean that is a concept that has existed in the 12 technical world since we've been making 13 14 measurements.

And I think perhaps what is needed is a statistical expert to explain this stuff to us. Because I take it there are no statisticians in the room, because no one's jumping up to explain this.

20 MR. TONACHEL: Yeah, I guess, I 21 appreciate that, Mike. The thing that I'm trying 22 to get to is that ultimately this comes down to 23 what does people -- everything is going to have 24 some level of uncertainty in it -- and what is the 25 level of uncertainty that people are comfortable

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with under different types of rating scenarios.

MR. MEIER: This is Alan Meier. 2 I have a couple questions here. First of all, I 3 4 appreciate the presentation today. I think it's 5 wonderful. We can actually focus on the real 6 question. 7 First of all, let me make sure I 8 understand it. Those uncertainties are based on three tire tests, is that correct? 9 10 MR. GUINEY: Yeah. Now, you have to remember the formula is the average misalignment 11 remaining, which is .08. So you take all eight of 12 these and you average -- you take the average 13 14 misalignment between the two labs, that's the .08. 15 And then you take the variability of the misalignment, that's the .24. And you multiply it 16 by 1.96 to get the 95 percent calculation of -- or 17 18 5 percent not explained. So we have not included product 19 20 variation in this. Product variation is excluded. 21 It is strictly the average misalignment plus the 22 variability of misalignment, not the variability in this box, itself. 23 24 Because you want to know what is the uncertainty with regard to the lab. Not throwing 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

1 in product variation.

2	MR. MEIER: So if we increase the number
3	of tires in each of those samples, does that
4	increase decrease the uncertainty?
5	MR. GUINEY: No. What it could do is it
6	could this very uncertainty we're talking about
7	is where is the center of the proxes CT01 tire.
8	Where if you had 100 of these, or 200 of these,
9	where
10	MR. MEIER: I understand.
11	MR. GUINEY: where is the central
12	value for that tire model. If you increased from
13	three to 20, you're going to get a much better
14	description of where that central point is.
15	So all you would do is you may improve
16	the alignment, the average alignment number. And
17	you may slightly change the average alignment
18	or the variability of the alignment.
19	MR. MEIER: Okay. I'm going to come
20	back to that one later. But, what if I guess
21	the next question is you assumed kind of a normal
22	distribution.
23	An alternative approach would be to say
24	how confident can I be that the number that I
25	report is less than, the actual value is less than
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1 what I report.

2 MR. GUINEY: Yes, okay. MR. MEIER: Which would, I think, if I 3 4 understand my -- sub statistics, then I don't need 5 to think about so much a normal, as more of a one-6 tailed distribution and other kinds of 7 requirements can apply. And actually you can use 8 a much -- you actually have less uncertainty, or 9 more confidence about the value reporting. 10 So that if you avoid this bin approach and just say how confident can I be that the 11 number is below the number that I'm reporting, 12 then you actually have a greater certainty. 13 MR. GUINEY: Yeah, and that's what we 14 talk about in terms of you've got to ask the 15 engineer how certain are you with respect to some 16 17 number. 18 MR. MEIER: Yeah. MR. GUINEY: So the bin only is derived 19 from, can you tell me, is it below that or above 20 21 that. 22 MR. MEIER: Yeah, but --MR. GUINEY: And he'll say -- he'll 23 24 say --25 MR. MEIER: But just sort of for the

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record, if you don't go the bin route and say how 1 confident can I be that the reported value, the 2 actual value is less than the reported value. 3 4 Then your confidence increases with the same data, 5 because you don't have to worry about the other 6 side of the distribution. You don't have to worry 7 about it being --8 MR. GUINEY: What is the risk that the tire is over-graded is basically what you're 9 saying? 10 MR. MEIER: Yes, yes. 11 MR. GUINEY: And you can do it that way. 12 MR. MEIER: Yes. And then your 13 14 certainty increases, probably doubles. MR. GUINEY: Well, if you use the 5 15 sigma limit you're going to end up -- that 16 answer's going to be half of this bin width. 17 MR. MEIER: We'll talk about that later. 18 MR. GUINEY: Yeah. 19 20 MR. WISCHHUSEN: Mike Wischhusen, 21 Michelin, again. Just make a comment, try to --22 let's put this all in context. You know, we're here discussing AB-844, 23 which mandates the creation of a consumer 24 25 information system about the impact of tires on

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vehicles' fuel efficiency.

2 No one loves a rousing discussion about statistics more than I do, but let's keep in mind 3 4 the big picture here, what we are here to do. And 5 not get sidetracked about, you know, some very 6 very small effects on what we're doing. Because 7 there's a lot of information to be presented 8 today. And we're not making a lot of headway getting through it. Thanks. 9 10 MR. GUINEY: Anyhow, we can go to the 11 next slide. MR. TUVELL: I have a comment first. 12 13 MR. GUINEY: What we want to do is share 14 with you another lab pair, just so you had two 15 examples of this, not just one. MR. TUVELL: Yeah, can I just make one 16 17 more comment. And I appreciate your comment, 18 Mike, but whether we like it or not in 844 it also 19 directs us to adopt a test protocol. And 20 significant to the test protocol is we're all 21 homing in one 28580. 22 And if there's some representation that 28580 yields numbers that have a high span, or in 23 24 other words a low degree of accuracy, we all need 25 to know that.

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Now, I'm not a statistical expert,
 either. And I don't pretend to be. But I look at
 the information that's being presented today, and
 I'm interpreting that as a very high degree of
 variability.

6 And this is the first time I've seen 7 anything that even remotely suggests that on 8 28580. That I've always been led to believe, in fact, it's the exact opposite. It's the exact 9 10 opposite, that they worked so hard to refine it to insure a very very low level of variability. Not 11 only repeatability in individual labs, but lab-to-12 13 lab variability.

And so I think maybe what's happening here is the subject is being complicated by reducing it to a statistical, you know, analyses, and you recognize that. I certainly recognize that.

But I'd love to get people from the 20 28580 committee who's responsible for this lab-to-21 lab variation issue and sit down with them and 22 say, guys, how did you resolve this and what did 23 you come up with. Why did you stop where you are 24 now on this and say let's go ahead and adopt this 25 standard.

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MR. GUINEY: And to speak on behalf 1 of -- I was at some of the meetings and understood 2 what they did. They were responsible to come up 3 4 with a test protocol that allowed single-point 5 testing, and would address lab alignment. And 6 they finished their work. 7 This issue that we're talking about here 8 comes into once you take those results and apply them to some standard or some requirement, the 9 uncertainty with which being correct results. 10 And people holding, again, the tire 11 manufacturers accountable for being right. 12 13 Because that will happen, I guarantee you we will 14 be held accountable for being correct. 15 And this analysis just gives you a little glimpse -- I know it's complicated and I 16 apologize -- it gives you a little glimpse of the 17 18 uncertainty that engineers have to deal with to give you the correct answer and be accountable for 19 20 it. 21 We just went to another lab pair so you 22 knew we didn't just cherrypick the best lab here. 23 But, anyhow, here's --24 DR. WADDELL: I have a question on the 25 last slide before we --

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1 MR. GUINEY: Sure. No, I'm sorry, I'm 2 sorry.

DR. WADDELL: -- proceed. Walter 3 4 Waddell, Exxon Mobil. What it looks to me, 5 forgetting all of these statistics, because I do 6 that on my computer, is we've drawn up a bin shown 7 here in pink for the worst tire out of the eight, 8 comparing only two labs for three tires. And that really was Alan Meier's question, is you need more 9 10 data, more tire brands or more labs to narrow the 11 window. Not more repeats of the process. MR. GUINEY: No. If that was the 12 13 impression, this is the composite of all eight of 14 working, not just one. DR. WADDELL: I understand that. But 15 what I'm looking at here is you got the worst 16 tire; you doubled its error limits, call that a 17 18 band. And you've doubled the error limits based 19 only on two labs for one tire. 20 MR. GUINEY: No. These calculations are 21 based on --DR. WADDELL: I understand all the 22 23 calculation --24 MR. GUINEY: -- all eight tires --25 DR. WADDELL: -- arguments, okay. But

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1 that band width is 1.5.

2 MR. GUINEY: Yeah. DR. WADDELL: Nowhere in the 3 4 calculations does it say that. So Alan Meier says 5 you got to narrow that 1.39 by more testing. And 6 you talked about testing the worst tire. We're 7 saying you need to have more labs test the same 8 tires, and more labs test more different tires to find out what the real variability is. 9 10 MR. GUINEY: Yeah, you --11 DR. WADDELL: Because you've already addressed the machine. And this now introduces 12 13 the tire variability. 14 MR. GUINEY: Yeah, the cost associated 15 with any testing schemes to reduce uncertainty can be dealt with at a future meeting. This is just 16 17 an example of what was done to decide what is the best way forward in aligning labs, and to meet the 18 19 purposes of a good alignment procedure. 20 DR. WADDELL: Right, but I'm saying I 21 look at a picture whose band width is twice the 22 worst tire of merely two labs. MR. GUINEY: Yeah, you'll have to 23 24 honestly dig into the statistics because that is, in fact, when you look at all of these and you 25

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look at how these formulas are derived, that is, 1 2 in fact, what is contained in all of this testing. Now, so I understand your 3 4 interpretation, but in fact it's based on all this 5 data. It is not based on just the worst tire. 6 DR. WADDELL: But visually that's what I 7 see. 8 MR. GUINEY: I understand visually. I mean I can't help what happens in actuality. I'm 9 just explaining how it's derived. Visually you 10 can come to that conclusion, but in fact it's 11 derived from all this data. 12

13 Now, go ahead. It's the same, I just 14 wanted to show you -- forget that -- that was lab 15 FL doing its alignment work. This is lab F-L -go forward -- this is lab F-L doing the same 16 17 alignment work. Sorry the arrows aren't in the right place. Came up with their equation; made 18 19 sure that their machines were where they needed to 20 be.

Go to the next one. Unaligned data showing the raw unaligned lab disagreement. Next slide. And the uncertainty was a little better between the lab pair F and L. It was down to .51. And the total uncertainty plus the risk of being

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wrong, or this relative bin width is at 1.28.

That's the -- I just want to conclude, 2 since I'm taking a long time, I want to just give 3 4 you the basic conclusions. Next slide. You can 5 go past that, because we already --6 So, C-sub-R is an appropriate 7 characteristic to analyze and categorize tire 8 rolling resistance information. ISO 28580 provides an effective methodology for aligning 9

10 labs based on C-sub-R. And the aligned results 11 are required to be reported.

But a very important point is some amount of variation lab to lab, and within lab, remains after alignment and creates uncertainty. That residual misalignment lab to lab and within lab creates this uncertainty number we have to deal with.

All we're saying is the way we typically deal with that in the tire industry is to apply categorical ratings, not actual numerical numbers. And we can discuss that further at a future workshop, or whatever you propose.

23 And then the presentations following 24 will help demonstrate how categorical ratings can 25 effectively avoid some of the issues that have

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been raised in prior workshops about customer or
 consumer confusion. And bring up an issue of how
 we avoid some potentially inappropriate tire
 selections that could occur if you do not use
 categorical ratings.

So, we've had plenty of questions,
plenty of discussion. Sorry it took so long, but
that's the nature of the beast. Thank you.

9 MR. TUVELL: I just have sort of an 10 impromptu slide that I want to present that helps 11 illustrate my confusion on this subject, if you 12 don't mind.

13 (Pause.)

MR. TUVELL: I appreciate your patience dealing with this. This sort of came up at the last minute. We weren't necessarily expecting to show this. So it wasn't we rehearsed this. For some reason it's now showing correctly.

19 MR. GOTTLIEB: Dan, Dan, Adam Gottlieb 20 with the Energy Commission. You are using the 21 term "they" when referring to the ISO 28580. Can 22 you identify who they are, who is the amorphous 23 group that defines or that makes this 24 determination?

25 MR. GUINEY: I have to go back -- I'd

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have to go back to the actual participant list. 1 2 But it was --MR. GOTTLIEB: Is it a U.S. group, is it 3 4 a federal group, is it --5 MR. GUINEY: No. It's a global tire 6 industry group. 7 MR. WISCHHUSEN: Tires, vehicle makers, 8 testing. I mean it's not limited to the tire industry. 9 10 MR. GUINEY: No, yeah, it's not. It's the global -- in the case of 28580 it's the global 11 community interested in that. 12 MR. MEIER: May I ask some questions 13 14 while they're getting this fixed up? This is Alan 15 Meier. So, first of all, we were having a side 16 discussion there. For the moment assuming that 17 18 there were bins, are you suggesting that the bin size should be the same through the statistics? 19 20 MR. GUINEY: Later on we will share some 21 information in another presentation that kind of 22 shows our concept of how that could help the consumer make a choice. 23 24 So that, say, for example, I wanted to choose tire A versus tire B. Tire A being in a 25

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better energy category than tire B. And maybe a
 third or fourth category above that.

We were looking at constant bin widths to help have relatively constant amount of fuel economy difference as you move between the different bin widths.

7 Because the customer is interest, I 8 guess, in my opinion, in miles per gallon on got 9 on my car after I bought your tires. So we were 10 thinking that if we used the constant bin width 11 it's going to be more simple to present to him 12 what fuel economy benefit is he going to gain by 13 picking tires in different bins.

14 And it would be relatively constant15 between the different bins.

16 MR. MEIER: Thanks. This is a slightly 17 unrelated question, but maybe you know the answer. 18 When the automobile manufacturers request rolling 19 resistance data from the tire manufacturers, how 20 many tires do they request being tested?

21 MR. GUINEY: I'm not the best one to 22 ask. I know in our case it varies depending on 23 the maker. I think the minimum I've ever seen is 24 three per test group. But it does go higher. 25 Anybody else? Tim.

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MR. ROBINSON: Yeah, typically it's 1 2 three; it can be higher -- always usually basically --3 MR. TUVELL: Can you come to the mic? 4 5 MR. ROBINSON: Sure. Yeah, Tim Robinson 6 from Bridgestone. Typically it's three at a 7 minimum. Sometimes it can be more depending upon 8 the repeatability, variability of your testing. But in every case their targets are typically set 9 10 based upon rolling resistance coefficient as opposed to rolling resistance force. We'll get 11 into that a little bit later. 12 13 MR. MEIER: But no manufacturers require 14 more than three? 15 MR. ROBINSON: I'm sorry? MR. MEIER: All manufacturers are just 16 about three? There's none that are greater than 17 18 three that you're aware of? MR. ROBINSON: There could be some that 19 are greater than three. Basically though it's 20 21 typically three. 22 MR. MEIER: Okay. Thank you. MR. TUVELL: Mike, I grabbed this off 23 24 the internet. It's a Michelin presentation. You 25 see the date there. I don't know exactly where --

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the context of it. And so bear with me here. I 1 2 want to go towards a slide at the end. Having a slow time catching up, hold on. 3 4 (Pause.) 5 MR. TUVELL: It appears that we're not 6 going to be able to get this to come up. We'll 7 work on it during lunchtime so I can show you --8 find a way to get it up so I can illustrate the 9 point. I appreciate everyone's patience. 10 MS. NORBERG: While we're getting the 11 presentation up, just as a time check I know we're at 11:35 a.m. We were way too -- to discuss an 12 13 important subject. But I just wanted to check 14 with everyone in the audience, given that we're 15 getting near the noon hour, do we want to -- I mean is it all right if we -- if this goes an hour 16 or 45 minutes, are we good without taking the 17 18 lunch break now? Is everybody comfortable with that? 19 20 Yeah. No one looks like they're dying. 21 Okay. I just wanted to check, thank you. 22 (Pause.) DR. HAWLEY: Thank you for getting the 23 24 PowerPoint up. I'm Mark Hawley; I'm with ENVIRON 25 Corporation, working on behalf of the Rubber

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Manufacturers Association. And I did some 1 analysis of data, compilation of data, and then 2 analysis of data, data produced and available from 3 4 a variety of sources. And that's what I'm going 5 to talk about here. 6 Next slide, please. 7 MR. SPEAKER: Sorry, Mark, could you get 8 closer to the microphone? 9 DR. HAWLEY: Certainly. Is this better? 10 MR. SPEAKER: That's better, yes. DR. HAWLEY: My second slide simply lays 11 out the contents of the presentation, that is I'll 12 13 talk about the objectives, describe the datasets, 14 market coverage, distribution of the RRC values, 15 sources of variation and then some points of discussion. 16 Next slide, please. These are the 17 18 objectives of the work that ENVIRON did on the RRC values. First objective was to compile a 19 20 comprehensive dataset. There have been a number of sources that have distributed or made available 21 22 RRC values. We want to bring these all together and see if the collected or combined dataset 23 24 provided us with information that was useful. 25 Second, following up on a suggestion by

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the Transportation Research Board, we thought we should look at, make sure that we had evaluated the degree of market coverage available in the existing RRC datasets.

5 The TRP publication had noted that it 6 was important to think about relative sales for 7 individual tires when you were evaluating the 8 variability in RRC data, in terms of how the 9 market, as a whole, would be represented by those 10 data.

11 The third point, or the third objective 12 was to characterize the distribution of RRC values 13 in the domestic replacement tire market. Of 14 course, this is the state of California workshop, 15 but we did not focus exclusively on the California 16 market.

And then the fourth objective was to evaluate sources of variation and uncertainty associated with the RRC values that were in the combined dataset.

21 Next slide, please. The first of the 22 available datasets I've listed here is the one 23 produced for the California Energy Commission, 24 which, of course, involved five replicates 25 produced by the same laboratory, and I understand

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on the same machine, for each of 149 passenger car
 tires.

The CEC data report provided numbers in terms of rolling resistance force. So we calculated the RRC values from those rolling resistance values. Other tire characteristics were also reported.

8 The data that we obtained from the 9 literature included two datasets produced by the 10 Transportation Research Board, or provided by the 11 Transportation Research Board. This is the 2005 12 report, SR286.

And the data that were the basis for that report include dataset of 34 observations, after we've eliminated the ones that aren't relevant to the specific passenger car tire limitation here. Thirty four reported by ECOS in 2002 and 162 RRC values reported by RMA numbers who submitted those data to the TRB back in 2005.

20 And then we, since we're working for the 21 Rubber Manufacturers Association, we requested 22 additional data from the RMA members. And we were 23 provided with additional sets of data by some of 24 the member manufacturers totaling another 662 25 passenger car tires.

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Combining these three datasets gives us a gross count of 1007 RRC test values with varying numbers of replicates represented by each of those test values. And varying levels and kinds of additional information on each of the tested tires.

Next slide, please. The variables we
looked at in conducting this analysis included a
group of variables used to identify the tires,
such as the manufacturer, brand, model and so on.

11 Two of the characteristics in this first 12 bullet, load index and speed rating, are really 13 measures of, or indices of the service for which 14 the tire is designed, a service description.

15 And then we also included in the tire identification category the size, which is defined 16 by three dimensions, the rim diameter, the section 17 18 width, and the aspect ratio. And also a prefix. Since we're focused on passenger car tires, the 19 prefix really comes down to P metric versus Euro 20 21 metric. Light truck tires have been excluded from 22 the dataset.

The variable that we're focused on, understanding the variation in the distribution of this, the rolling resistance, we used rolling

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resistance coefficient and, of course, for the CEC
 dataset we computed that from the rolling
 resistance force.

And then the other tire characteristics for which we had data for some, but not all, of the tires, included the UTQG ratings, traction, temperature and tread wear, the tire weight, the tread depth and the outside diameter.

9 And we were interested not just in 10 looking at the RRC values, themselves, but also to 11 see how those other variables related to RRC.

12 Next slide, please. To combine the 13 datasets we first looked at them critically to see 14 whether or not there were observations that should 15 be excluded, or, in fact, if there were errors 16 that should be corrected. With the TRB dataset 17 there were a few minor errors that we had to 18 correct.

And they and some of the other data sources reported speed rating not as an individual value, such as S or T or V, but as a group. For example, S,T or H,V. They had defined speed rating groups that in some cases were the same from one dataset to another, and in others different between the datasets.

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So we went and did our best to assign 1 individual speed ratings to each of the tires in 2 the TRB datasets. And load index values, as well. 3 4 The CEC dataset provided the actual 5 speed rating and the load index and most of the 6 other variables of interest to us. We did take 7 the average of the five replicates, and the 8 rolling resistance force, and then convert that average to a single RRC value for each of the 149 9 10 tires that were tested. The additional datasets we received from 11 the RMA members varied in terms of the number of 12 13 replicates per tire. So we would look at RRC 14 value for one manufacturer and see that that was 15 an average of three replicates. And in others it was based on a single test. 16 17 Where it was possible for us to determine not just in the recent RMA member 18 19 datasets, but in the others, we made sure that we 20 knew how many replicates were represented by each 21 of these RRC values. We weeded out tires that were 22 23 represented in the dataset, but which, I think, 24 are not considered in the proposed regulation by excluding all LT, light truck, tires. And winter/ 25

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1 traction tread tires.

We included RRC values and data for 2 original equipment tires, because almost all 3 4 original equipment tires are also available as 5 replacement tires. 6 As I said, the current count is 1007 RRC 7 values with identifying information. But the 8 extent of the additional information on variables, especially such as tire weight, outside diameter, 9 10 tread depth, is variable from one RRC test value to another. 11 Our second objective was to see how well 12 13 this dataset characterized or represented the 14 replacement tire market. We had to try to 15 evaluate this without having any sales data that were specific to individual tires. 16 And RMA members provided us -- RMA 17 actually provided this compiled dataset that 18 19 showed tire shipments, domestic tire shipments for 20 the calendar year 2006. And we used this as the 21 basis for estimating domestic sales. 22 Again, second bullet. The sales data are not available for specific tire brands, 23 24 models, stock keeping units, or states. We don't have data for California only. 25

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We used the RMA tire shipment data to estimate the percentage of the 2006 domestic passenger car replacement tire market accounted for by specific combinations of tire size and speed rating.

6 And these percentage estimates are based 7 on shipments by RMA members which represent 8 approximately 90 percent of the domestic replacement tire market. So we had some 9 10 confidence that the numbers were reasonably good. 11 Next slide, please. In terms of market coverage what we find is that the combined 1007 12 13 observation RRC dataset includes tests on 14 approximately 150 different sizes of tires with 15 various speed ratings.

Many of those sizes, probably most of those sizes are produced in only one or two speed rating codes. There are many combinations of size and speed rating that are manufactured and sold.

20 Speed ratings, as related to tire 21 construction characteristics, can influence the 22 rolling resistance coefficient. And the tire 23 characteristics that relate to the speed rating 24 suggest four speed rating groups can be 25 established. Those being H, -- and speed ratings,

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the higher speeds are farther along in the alphabet generally with the exception of H, just to keep everything from being too transparent.

H, V which is faster than H, ZR which
includes W, Y and Z rated tires. And then all
others. That is the lower speed tires which have
letter designations up to T. And in some cases
not all the tires have speed ratings on them.

9 Size and speed rating are often related, 10 that is higher speed ratings are typically found 11 in sizes with larger rim diameters and lower 12 aspect ratios.

And collectively in our combined RRC dataset we have test data, RRC test data for more than 200 combinations of tire size and wannabe sport SR groups that are sold in the domestic replacement tire market.

Take all together, the tire sizes
represented in the combined RRC test dataset
account for more than 92 percent of the 2006
domestic replacement tire market as gauged by the
tire shipments by the RMA members.

The 200, more than 200, actually, combinations of size and SR group represented in the dataset account for almost 88 percent of the

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market. So, the first bullet there is considering size alone. We've accounted for more than 92 percent. If we look at the combination of size and speed rating, we've covered about 88 percent of the market.

6 What's critical, though, is that none of 7 the untested combinations, none of the 8 combinations of size and speed rating group for 9 which we don't have RRC data in the combined 10 dataset account for as much as half of a percent 11 of the market.

12 So, the portion of the market that's not 13 accounted for by these 200-plus combinations is 14 distributed over a very wide and very large number 15 of combinations that haven't yet been tested size 16 and SR group.

We also looked to see whether the 17 distribution of RRC test values we had across 18 19 these 200 combinations, many of which had more 20 than were represented by more than one of RRC test 21 value, was the distribution of RRC values in the 22 combined datasets, similar to the proportions of 23 sales represented by those combinations. In some 24 cases it was, and in some cases it wasn't. It 25 certainly wasn't a well balanced dataset.

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In terms of characterizing the 1 2 distribution of RRC values in the replacement tire market, which is the third objective, we took two 3 approaches. One was simply to use the available 4 5 RRC test data values. And the second was to 6 combine, or to use the tire shipment and sales 7 data to assign weight to those RRC test data 8 values. 9 And it's actually -- like we're using 10 those two methods to address somewhat different objectives. If you think about characterizing the 11 market, the replacement tire market, though, the 12 13 sales-weighted figures are the ones that would be 14 closer to, I think, what you're interested in 15 evaluating. Each of these two approaches allows us 16 17 to develop a curve that represents the

18 distribution of RRC values in the market. And as 19 shown on the next figure, the curves are nearly 20 identical.

The red curve here is simply representing the unweighted RRC dataset of all the values combined, 1007 values. At the blue curve, which is very similar, is after the sales weighting has been applied to those numbers.

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Next slide, please. The fourth
 objective was to evaluate, to examine, identify
 and evaluate sources of variation in RRC values.
 And I like to think of this in terms of starting
 with an individual single measurement and working
 up from there.

7 Dan's presentation talked about efforts 8 to measure and control the repeatability of 9 measurements by specific laboratory working on the 10 same machine with the same tire. Once we get into 11 a question of the replacement tire market, there 12 are a lot more sources of variation that come into 13 this.

Focusing initially on sources of variation within a specific stock-keeping tire, the two primary sources are item-to-item variability. Because the tires are manufactured items, they aren't all exactly the same. So there's some variability between replicates.

And then second, variability due to differences between test machines. And, of course, the ISO standard is developed and will be implemented to try to address that second source of variability.

25 The variability for both of these

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sources should be considered in evaluating the uncertainty associated with an RRC value reported for an individual tire.

4 Differences in RRC values between SKUs 5 are separate from these two categories or sources 6 of variation I mentioned previously. We also 7 looked in the dataset and found that the 8 differences in RRC values between various SKUs don't appear to be very strongly related to other 9 10 variables in the combined dataset, such as the 11 size, UTQG ratings and so on and so forth, there's other variables listed here, are not very good at 12 13 -- they don't provide you with a high degree of 14 precision in predicting what the RRC value of a 15 specific SKU will be.

In terms of the variability with an SKU, the CEC dataset provides us something that we didn't previously have, and that is a dataset that can be used to look at the item-to-item variability. We have five replicates tested in the same laboratory on the same machine for each of 149 different SKUs, or types of tire.

And what I've shown here is a plot that shows on the horizontal axis simply the average rolling resistance coefficient calculated for each

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1 of those 149 tire lines.

2	At the black bars, the vertical bars
3	around that line are simply the confidence
4	intervals established for each of those RRC
5	values. And what's interesting about this is that
6	the width of the confidence interval appears to be
7	unrelated to the RRC value. That is you don't see
8	the confidence intervals getting larger as you go
9	up or down on the horizontal axis.
10	Next slide, please. The 95 percent
11	confidence intervals that are shown on the
12	preceding figure were simply computed from five
13	replicates from the same laboratory for each of
14	the tested tires.
15	The half widths of the confidence
16	interval is a function of the sample size, in this
17	case 5. And the test-to-test variation, or what I
18	had previously referred to as the item-to-item
19	variation, but it really also includes the
20	repeatability that Dan was talking about in his
21	presentation about the ISO standards. So it's
22	probably better to refer to it as the test-to-test
23	variation.
24	The half widths computed from five
25	replicates for these 149 tire lines range from .03

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to 1.3. And the average half width is .26. So there is quite a range of variability or levels of variability from one tire to another evident in this dataset.

5 This item-to-item variability, I think, 6 causes substantial uncertainty, at least in some 7 RRC values. Some of them are obviously measured 8 very accurately, or can be estimated very accurately, in that the error bar is plus or minus 9 10 .03. Whereas others are not so accurately 11 measured, as in the example here, 10 plus or minus 1.3. 12

The level of variation among the five 13 14 replicates then is obviously varying substantially 15 from one tire, or SKU, to another. And that level of variability does not appear to be strongly 16 17 related to any of the other tire characteristics. It certainly doesn't appear to be strongly related 18 19 to the average RRC, but it's also not strongly 20 related or well explained by size or speed rating 21 or any of the other variables that we have here. 22 In pair-wise comparisons between the tires for which we have the five replicates, many 23 24 of the mean RRC values estimated from the CEC dataset would not be significantly different. 25 Ι

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think that's visible probably better by inspection of the preceding slide with the graph -- could you go back to that -- where you see large overlaps in the error bars for two tires.

5 The likelihood that you would conclude 6 in a statistical sense that these are 7 significantly different in terms of their average 8 RRC is very small. You'd be looking for pairs of tires where the error bars do not overlap before 9 10 you would expect to have a statistically valid conclusion that, yes, this RRC is higher or lower 11 than the RRC of this other tire. 12

13 So then just to follow up on these 14 points. We put together a dataset by combining data from various sources that has a lot of RRC 15 observations, over 1000 observations, in them. 16 But it includes sources of variation that we don't 17 18 expect to have to deal with once everybody starts using the new ISO method. Particularly inter-lab 19 20 variability which we expect will be largely 21 compensated for and quantified.

I was not in a position to be able to quantify any of the inter-lab variability with the dataset that I put together by combining these things. I had no way of knowing whether there was

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a systematic difference between the values
 reported by ECOS and one of my manufacturers, or
 one of the other manufacturers, and so on and so
 forth.

5 Although we thought about it, I don't 6 think we'll find that there is a way to go back 7 and correct retrospectively for that source of 8 variation. So we have this combined dataset that has a source of variation that we don't expect to 9 10 have to deal with, at least to a great degree in a 11 nonquantitative fashion going forward. But I don't think we'll be able to retrospectively go 12 back and remove or account for that variation in 13 14 the existing dataset.

15 MR. GUINEY: Yeah, I just wanted to make 16 one point. The chart with the CEC data would not 17 benefit from any of the alignment because that was 18 one machine tested at that particular laboratory.

So that's still real. Regardless of the
 ISO alignment.

21 DR. HAWLEY: The second point for 22 discussion here concerns the market coverage. 23 Again, this is based on tire shipments by RMA 24 manufacturers, but the analysis suggests that the 25 RRC data that we combined in this larger dataset

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represents a very large proportion of the total
 replacement tire market.

The third point with regard to the distribution of RRC values focusing, I think, on the sales-weighted, as a result of having what we believe is good market coverage in the RRC dataset, there was very little difference between the sales-weighted and the unweighted distributions.

10 And they are reasonably well behaved 11 statistical distributions. They are not highly 12 skewed; they're not bimodal; they're not 13 complicated by a number of things that you might 14 expect to see, or at least dread seeing when you 15 combine data from a variety of different sources 16 like this.

And then last, in the order of the 17 18 objectives that we worked towards is the sources of variation, again. The CEC dataset provides 19 20 insight into the variability you can expect for 21 repeated testing in the same laboratory on replicates, that is different tires, different 22 items from the same SKU, the same tire line. 23 And what we see there is that some tires 24 cluster very tightly. That is, have very little 25

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tire-to-tire variability or test-to-test variability in terms of the RRC value. And others have substantially more.

And fortunately it's not my problem then to decide how will you address that variability from one tire to another in terms of regulating the market.

8 But when I think of reporting RRC 9 values, one of the things you have to deal with is 10 well, how many significant digits, how many places 11 to the right of the decimal are you going to 12 report.

And I could envision coming to the conclusion that a reasonable way to report these is only to the left of the decimal place. We have a tire that rates 7, 8, 9, 10. Some tires you can report to a very much smaller interval than that.

18 But regardless of what number you put 19 out there, even if you had three places to the right of the decimal place, you're still reporting 20 21 an interval. Only need to -- once you recognize 22 that you're reporting an interval, then the question to be addressed is how wide should those 23 24 intervals be. And I think that's a question that has to be answered by regulators. 25

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Any other questions, comments?

MR. TUVELL: Yes, let me -- Ray Tuvell 2 with the Energy Commission. Let me ask a question 3 4 specifically to your last point on how many places 5 on each side of the decimal point. 6 I'm generally familiar with all the 7 datasets that you reviewed, except I haven't seen 8 the RMA data. And obviously I understand that the Energy Commission dataset, the TRB dataset and the 9 10 ECOS dataset. If you think about it for a second, on 11 all those datasets how many places to the right 12 side of the decimal point were reported? 13

14DR. HAWLEY: I think typically two.15MR. TUVELL: Typically two.

DR. HAWLEY: Um-hum.

MR. TUVELL: So that's my understanding, also. That historically that's what the industry has always reported. Do you know something different than what I know in any of these datasets?

22 DR. HAWLEY: I wouldn't be the best 23 person to answer that. In terms of the datasets 24 that I saw, I remember looking at the 25 Transportation Research Board publication, the SR-

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286 publication. And they did discuss earlier 1 datasets. But I don't recall what numbers --2 excuse, significant digits for reporting those 3 4 datasets. We could probably go back and look at 5 that. 6 MR. TUVELL: So for the RMA datasets 7 that were given to you, how many points to the 8 side of the decimal point were they reported? 9 DR. HAWLEY: It varied from one 10 manufacturer to another. MR. TUVELL: Okay. And what was the 11 variation? 12 DR. HAWLEY: I'd have to go back and 13 14 look because the first thing I did was mask it 15 down to two, because carrying numbers with six or eight significant digits to the right of the 16 decimal point in my Excel spreadsheets was --17 18 MR. TUVELL: Sure. DR. HAWLEY: -- just an annoyance. It 19 wasn't helpful. So I can't tell you for sure. 20 21 MR. SPEAKER: It was at least two --22 DR. HAWLEY: Yes, in each case I think it was at least two. 23 24 MR. TUVELL: So at least two. I mean that's what I wanted to confirm, also, if your 25

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observation is the same as mine. Apparently 1 historical practices, for whatever reasons, it's 2 been two, two to the right of the decimal, to the 3 4 hundredths is what I see on almost all the data. 5 And I just wanted to make sure that if 6 anybody's seen something -- or did you see any 7 qualifications in any of that data that said, 8 we're going to report to the hundredths, but you can't do this, or it's not accurate --9 10 DR. HAWLEY: No, I haven't seen that. MR. TUVELL: -- or anything like that? 11 DR. HAWLEY: I think most people, most 12 engineers, at least, -- I'm an engineer, I'm not a 13 statistician, either, although I'm providing 14 15 statistical advice here, and I do have a minor in statistics. I am not a statistician by trade. 16 I'm an engineer, an environmental engineer. 17 18 I think that in engineering, at least, 19 the common assumption is that you carry through 20 significant digits until you reach the end of your 21 calculations. That is, you use the numbers as you 22 intend to use them, and then you decide where to round off. 23 24 Now, if, as a statistician, I was interested in comparing the mean values 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

represented by the average of five replicates for
 two different specific tire lines I wouldn't round
 off at all. I'd carry more than two significant,
 or more than two digits to the right of the
 decimal place through those calculations.

6 MR. TUVELL: Yes, I was just trying to 7 understand how you went from the fact that your 8 observation of the data showed all others at least 9 reported to the hundredths to coming up with the 10 recommendation that no, you never report anything 11 less than a whole number, which is what I thought 12 I heard you say.

DR. HAWLEY: If I suggested that I would never report anything to less than a whole number I'm sorry about that. That's not the impression I meant to give.

The impression I meant to give is that for some of the tires reported in the CEC dataset the level of accuracy that's justified in reporting that RRC value, that the average of 5 is probably only good to the decimal point.

When you have 10 plus or minus 1.3 as a confidence interval for the mean value, you can be almost 95 percent certain that the actual mean value for that tire is between 9 and 11. But you

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1 2 certainly can't be highly confident that it's between 9.9 and 10.1.

MR. TUVELL: I understand, but you're 10 to the plus or minus 1.3 I believe is the extreme example of some of the worst tire variations we saw. And, in fact, the vast majority -- and I have the data here, we can roll it up if you'd like to go over it -- shows that the very narrow bands in the vast majority of cases --

10 DR. HAWLEY: Some of them are very 11 narrow, yes.

MR. TUVELL: Right. And that where you saw these high degree of variations there were indicators of other potential reasons why. Like in some cases we saw high variations in that tire, one of five. And you take a look and all of a sudden you say, why does this tire weigh a pound and a half more than the rest of them.

19 Or you look at the DOT serial code on it 20 and you find that, gee, this one tire was made at 21 a substantially different date, different plant 22 location than the other four tires.

And there starts becoming some meaning to what's going on here. But there's ways to question or explain what's going on to the data

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that not just simply say let's aggregate it all 1 and say, oh, gee, it's plus or minus 1.3 RRC 2 variation across all of them. That's --3 4 DR. HAWLEY: Well, I didn't mean to 5 imply, if I did, that it was plus or minus 1.3 for 6 all of them. 7 MR. TUVELL: Okay. But that was the 8 only numerical conclusion I saw in your slides is my problem. 9 10 DR. HAWLEY: I think that that is shown 11 as an example. MR. TUVELL: Extreme example. 12 13 DR. HAWLEY: It's an extreme example, 14 because the extremes are what's important here, I 15 think. That is, I also have the .03 in that same slide. That's the minimum, that's the smallest 16 half width that was observed. 17 18 And I report them both on that slide. I think the 1.3 is the example I showed because I 19 20 thought the tire with the highest half width was 21 the one that was most important of knowing what's 22 the limit, the upper limit of variability that's observed in this dataset. 23 MR. TUVELL: But, I guess --24 25 DR. HAWLEY: The lower limit, I think,

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we've already talked about in terms of Dan's ISO
 presentation. And I did point it out when I went
 through the slides.

MR. TUVELL: But I guess my point is you didn't take the next step of saying here's this one highest tire with the 1.3 variability. I wonder why. And start looking at the other data to try to investigate that and try to determine the reason why.

10 DR. HAWLEY: I looked at two things in that regard. First, I looked at the serial 11 numbers. And my recollection, and it's been a 12 13 little while since I did this, but my recollection 14 is that the majority of the 149 tested tires had 15 serial numbers that were very close to each other. It was not two or three or four much different 16 serial numbers within a set of five for most of 17 18 those.

When I looked at the combinations where there was the greatest variation among the five serial numbers, one of those had a relatively high variability, as represented by the half width. And I don't remember which one it was. It wasn't the 1.3. And the other two had relatively low variabilities, as measured by the half width. I

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1 have that in my notes; I didn't put it in my 2 presentation.

The next thing I looked at was to see 3 4 whether or not there was an apparent relationship 5 between the level of variability among the five 6 replicates and any of the other tire 7 characteristics for which I had information. The 8 average RRC, of course, as shown on the slide. But also the tire weight, the outside diameter, 9 10 the tread depth and all these other variables.

I I had averaged those as I averaged the rolling resistance force before I converted to rolling resistance coefficient for each set of five.

15 So I didn't go back and look in the RRC 16 dataset where all of the characteristics, 17 individual characteristics for each of the five 18 replicates were shown. Except for the serial 19 numbers. The serial numbers are the only one of 20 those variables that I looked at separately.

21 MR. TUVELL: I appreciate the answer. 22 And I welcome the opportunity, by the way, to sit 23 down with you and go over the data and share with 24 you the observations I've had on the same data, 25 and the reasons why you would be highly suspect

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about some of these tires. Maybe it's a quality 1 2 control issue associated with the manufacturer. DR. HAWLEY: Okay. Well, I'll be happy 3 4 to do that. 5 MR. MEIER: Alan Meier. I was outside 6 for a moment, so you may have already heard this 7 question. Was there -- I wasn't clear which data 8 were new that haven't been publicly presented 9 before? 10 There were several datasets, one you called the TRB, which I think that one is -- known 11 as the National Academy's? 12 13 DR. HAWLEY: Yes. 14 MR. MEIER: -- the National Academy? 15 DR. HAWLEY: Yes. MR. MEIER: Okay. 16 DR. HAWLEY: It's the same, essentially 17 18 two datasets within there. The TRB is the way I refer to it because I think it's their website 19 where you can find the data and download it now. 20 21 MR. MEIER: All right. 22 DR. HAWLEY: And it's actually two datasets. One includes, in terms of passenger car 23 24 tires, excluding light truck tires and winter tires and so on, I think it includes 162 25

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observations, RRC values, reported by RMA member 1 companies to the NAS when they were doing the 2 analysis back five years ago, four years ago. 3 4 And the other dataset, also distributed 5 by TRB, and included in their analysis is the ECOS 6 dataset, which I think started with 43 7 observations. And once you exclude the light 8 trucks and so on, comes down to 34. 9 MR. MEIER: So, I quess my original 10 question was is there any data that we haven't seen here before that hasn't been publicly 11 available, in your analysis? 12 DR. HAWLEY: Yes. In addition to the 13 14 ECOS dataset, the RMA dataset that was submitted to the TRB. And that was available from TRB. And 15 the CEC data. We also have an additional set of 16 measurements that I received from various RMA 17 18 members. And that, as far as I know, has not been distributed publicly yet. 19 20 MR. MEIER: Would it be possible to get 21 some separate displays of that data like you did for the CEC, because I think that would be useful 22 to show. 23 24 DR. HAWLEY: Not right now. 25 MR. MEIER: Okay. PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

DR. HAWLEY: I don't have anything 1 prepared that would show those observations --2 MR. MEIER: All right. 3 4 DR. HAWLEY: -- separately. 5 MR. MEIER: And I was just curious, the 6 data cover now, I guess, five years, span five 7 years? 8 DR. HAWLEY: Maybe more, yes. 9 MR. MEIER: Maybe more. 10 DR. HAWLEY: Um-hum. I'm not sure when ECOS actually did their analyses. They first 11 released the data, I think, in 2002. And I 12 received some of the RMA data from the members, 13 14 that hasn't yet been distributed, within the last 15 12 months. MR. MEIER: Um-hum. So if there's been 16 any improvement over time, it may --17 18 DR. HAWLEY: We have to make some choices, yeah. 19 20 MR. MEIER: -- it may actually -- it 21 might -- you have such a large sample you might 22 actually be able to capture some of that, if that's the --23 DR. HAWLEY: That's true. The TRB 24 25 publication in 2005 concluded, based on their

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comparison of the earlier datasets they had from 1 2 the '90s, and the data they received from the manufacturers and the ECOS data, that there had 3 4 been improvements, reductions in rolling 5 resistance coefficient over time. 6 MR. MEIER: Yes, I recall. 7 DR. HAWLEY: And that does call into 8 question whether the earliest of the data included 9 in our combined dataset, the ECOS data, should, in fact, be included in the combined dataset or not. 10 MR. MEIER: Thank you. 11 (Pause.) 12 MR. TUVELL: Tracey and I are nodding at 13 14 each other, so I think this would be a good time 15 for our lunch break. So, it's roughly 12:20. I'm thinking 16 1:30, no later than 1:30, please. And we all can 17 18 reconvene and start our meeting again promptly at 1:30. 19 20 Thank you very much. 21 (Whereupon, at 12:20 p.m., the staff 22 workshop was adjourned, to reconvene at 23 1:30 p.m., this same day.) --000--24 25

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AFTERNOON SESSION 1 2 1:32 p.m. MR. TUVELL: I'm sure that everybody 3 4 would agree, based on the time it took us to get 5 through the morning's matters, that we're going to 6 need every minute we can get this afternoon to 7 finish our pretty ambitious agenda. 8 What I would like to do, if you don't mind, is make a slight diversion from the agenda 9 10 to present a couple slides from this morning that I tried to present and we had technical problems 11 associated with it. 12 So I'm going to move over to the other 13 14 mic to do that, please. 15 (Pause.) MR. TUVELL: And, again, this is Ray 16 Tuvell with the California Energy Commission. I 17 wanted to show this slide. It's from a 18 presentation I received over the internet. And 19 20 it's a Michelin presentation from roughly 2006. 21 And my purpose in showing this is to go 22 directly to the issue of inter-lab variability problem. And to understand it properly, and I 23 24 think Dan did an excellent job, we need to be concerned if there's multiple labs doing testing, 25

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can we compare the results of one lab to another
 to another to another. Okay. Because there is an
 error built-in variability there that we need to
 deal with.

5 And the folks associated with ISO 28580, 6 I think, did an excellent job of identifying that 7 potential problem, deciding to take it on. Okay. 8 And so I tried to go back to find out some sources 9 of information to get a sense of, you know, what 10 did they identify and what sort of goals were they 11 after.

And this is where I found this
associated with this Michelin presentation. And
so it kind of speaks for itself.

Basically they recognize that there are lab-to-lab variability, and in this Michelin presentation, and I'm not going to say it's an individual person representing this. It is what you see it is there. And that's all I'm representing. I can't take it back to any source other than what you have here.

Point number two. An inter-lab
alignment procedure was performed between five
manufacturers and they obtained an accuracy of
plus or minus 2 percent.

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And then point number three. They 1 handed it off to ISO as part of the 28580 process. 2 And it is my belief that that was what 3 4 was used to direct the effort in the ISO 28580 5 standards to come up with the lab-to-lab alignment 6 procedure. 7 And so you can say I took the leap of 8 saying, gee, I think they were shooting for a plus 9 or minus 2 percent accuracy in lab-to-lab alignment in ISO 28580. 10 And so I wanted to share with the rest 11 of you where my perspective was coming from this 12 morning in my questioning of Dan. Okay. 13 14 And let's see here --MR. WISCHHUSEN: No, leave it up, 15 16 please. MR. TUVELL: Sure, yeah. 17 18 MR. WISCHHUSEN: Again, Mike Wischhusen, Michelin. The historical context here, the inter-19 20 lab alignment procedure did start within ETRTO, 21 which is the European Tire and Rim Technical 22 Organization. What you're looking at there was a 23 24 closed system of five labs with eight control 25 tires.

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What has come out of ISO is an open-1 2 ended system with an infinite number of labs and two control tires. 3 4 So there's more control tires will give 5 you what their labeling accuracy, I'm not sure 6 accuracy is precisely the right term to be using 7 there. But that's the difference that you're 8 seeing. 9 MR. TUVELL: Thank you, Mike. And then one other slide I wanted to show real quickly --10 11 hold on here a second, I'm operating two computers. 12 13 In this morning's presentation there was 14 a lot of discussion about the Energy Commission 15 datasets. And you saw some condensation of that. And that's also what I have done here, bear with 16 This is pretty gross stuff because it's got 17 me. 18 some of my analysis on it, too. 19 But the point that I wanted to get to is very straightforward. So here in the Energy 20 21 Commission testing we did tests of a sample of 22 five identical tires. So five Bridgestone, for example, insignia SE200s, and five Michelin 23 MXV4+s. And why did we do that? 24 25 Because we wanted to understand and

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identify that, in fact, we do expect to see some 1 variability in rolling resistance in what is 2 supposed to be otherwise identical tires. Right. 3 4 One would think, a consumer would think, 5 wrongly, we all understand, that if they buy five 6 insignia SE200s why would they expect to see 7 rolling resistance to be the same. 8 And we know that's an unrealistic expectation. This is a manufactured product and 9 10 there's going to be some level of variability. And so we would try to identify the extent of that 11 variability. 12 13 And so in the presentation that Mark 14 made this morning, he gave you a condensation of 15 this. But I wanted to show you really what some of this data shows. 16 So, for example, here you will see 17 18 across this group of five a really tight, I consider this to be a very tight grouping. In 19 20 other words, the range of high to low is only .2. 21 This is a tight grouping, which tells me high 22 quality control of a product. Now, what else does it tell me? And, 23 24 again, this is what it tells me. Am I right or 25 wrong? I don't know. It's an OE product.

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And my sense, in general, is that when tire manufacturers produce products for the OE marketplace, it's a very demanding marketplace. And they expect tight tolerances on their products, and they're getting it. And this is a good example of that. Okay.

Now, let me just quickly show you an
example of tires that aren't as tight. Hold on
here while the screen catches up with what I just
did.

11 Okay, here's an example. I just pulled 12 this one out of the blue, so it's a General, which 13 is a Continental product. Okay. And over here, 14 again, five samples. And you see the rolling 15 resistance variation. And wait a second. What 16 happened here? A 9.1 out of this group of five 17 all of a sudden tells you something.

Now, I'm not exactly sure what this one is telling me, frankly, because I'd like to look at the weight of the tire to see if I see a major difference. I don't.

This one I look over at tread wear depth and I'm going, wait a second, it's tread wear's the same as -- or its tread depth is the same as this one. This tread depth is a lot higher. Why

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didn't I see a higher rolling resistance here.
 didn't see it. I can't make sense of it.

But I understand it to be something that will automatically draw my attention when somebody gives me this dataset. Something's up here.

6 And the something up for me is going to 7 be it's the product. It's the tire. It is not 8 the test procedure.

Because we told our testers that you
start running into problems like this, you rerun
these tests and you assure me this data is good.
I have confidence in the data. The variability
I'm seeing here is in the product. Okay.

14And let me give you a couple more15examples just real quickly here so you'll know16what we came across. Here's a good example.

Okay, this one here, Goodyear. And 17 again, I'm looking at this rolling resistance. 18 Ι see this outlier. A 9.73. And you can see 19 substantially different than the other four. And 20 21 I look over here and go, uh-oh, wait a second 22 here. Why is the weight of this tire almost a pound heavier than the rest. Could this possibly 23 24 explain what's going on here, okay.

25 And so my point here is simply to

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mention I don't want to draw a conclusion and say 1 I'm right on this, I nailed it, here's the reason 2 why. 3 4 What I'm saying is when we get this data 5 we don't just randomly just throw it up and say, 6 gee, well, it varies all over. No, there's 7 reasons behind this. Okay. 8 And we suspect that if a manufacturer kept a closer eye on some of these products they 9 10 would see it, too. And so the potential of having high 11 degrees of variation in product, I think is 12 13 something that can be controlled by the 14 manufacturer, if there was a need for them to give it that level of attention. 15 MR. WISCHHUSEN: Can I ask a question? 16 MR. TUVELL: Yes. 17 18 MR. WISCHHUSEN: Is that last example you gave us OE or replacement? 19 20 MR. TUVELL: This one happens to be OE. 21 MR. WISCHHUSEN: Okay, thank you. MR. TUVELL: Yeah. And so let me tell 22 you the other story I will tell you, that, yeah, 23 24 I've learned so many stories as I've tried to pick up on this subject. 25

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First of all, and I think Dan mentioned 1 2 this, or somebody mentioned the presentation this morning, oh, you can, in fact, get OE tires in the 3 4 replacement marketplace, yes, you can. 5 Now, it's very difficult for most people 6 to be able to identify what they are. Okay. So 7 if you go out and look at a tire how would you 8 know that's an OE. I couldn't do it, but I have experts who can. 9 10 Unfortunately, we've been told that oftentimes the reason why OE tires end up in the 11 replacement marketplace is because they've been 12 13 rejected by the OE. So, do I know that to be the 14 truth? No, I don't know that to be the truth. But when I have found OE tire data it 15 seems to be here regular that thought goes through 16 my mind. That's, hmm, I'm wondering if that's a 17 18 partial explanation here. That somehow that got rejected by the OE, ended up in the marketplace; 19 we happened to purchase it. Don't know. Don't 20 21 know. 22 So, I just wanted to take a couple minutes to share with you some of the specifics 23 24 behind the data that you saw this morning. Tremendous amount of data that we have. A lot of 25

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1 analysis you can do. Lot more potential

explanations behind what's going on here. 2 And be happy to share this data with 3 4 anybody who wants to dig into it further. 5 So, again, I apologize for everybody 6 giving me the time to toss those in. They were 7 not on our agenda. And so I'll turn now to Gene 8 Petersen, who's our next scheduled speaker. 9 (Pause.) 10 MS. NORBERG: Tracey Norberg with the Rubber Manufacturers Association. I just wanted 11 to take a minute to wrap up from our morning 12 13 discussion and the information that Ray has 14 provided, and say I think we all from the tire 15 industry really appreciate the dialogue that was provided this morning on a lot of very tough 16 technical topics. 17 18 And are planning, as we move forward, to provide additional information hopefully to answer 19 20 some of the questions that have arisen here in the 21 docket, in the comment period on this workshop. 22 And we will be providing the complete ENVIRON report with all of the data and analyses during 23 24 that comment period. 25 But want to have a chance during the two

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weeks intervening between now and the 22nd to be 1 2 able to incorporate discussion and comments that we've had here today. 3 4 So I just wanted to kind of close the 5 discussion we had this morning, and let everyone 6 know that that's our plan moving forward. 7 Okay, so sorry about that, Gene. Thank 8 you. Turn it over to Gene Petersen from Consumers Union. 9 10 MR. PETERSEN: Well, good afternoon, 11 everybody. Yes, my name is Gene Petersen; I am tire program leader for Consumers Union. 12 13 Consumers Union is a company, if you're not 14 familiar with, they publish "Consumer Reports 15 Magazine" and consumerreports.org, a subscription website. 16 We do test many products including 17 And that's one of the things I'm going to 18 tires. 19 be talking about today. 20 Back in November Ray invited me to speak 21 to a November workshop. And there I talked about 22 consumers' perspective of tires, how they buy tires, what they feel -- by tires, so forth. So 23 24 I'm going to kind of go back and cover some of 25 that again.

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1	And then I'd like to touch on how we
2	rate tires, and talk about some of the comparisons
3	to some of the proposed rating systems that have
4	been proposed for rolling resistance.
5	Next slide. Okay.
6	(Pause.)
7	MR. PETERSEN: Well, that concludes my
8	presentation
9	(Laughter.)
10	MR. PETERSEN: Let me start off by
11	saying there's various sources where we get our
12	information from consumers. We're very interested
13	in what they want to know about tires. And I'm
14	going to just cover some of those sources.
15	First and foremost, we get letters from
16	readers. Last year alone we got over 1250
17	letters. And most of them go by my desk. So
18	that's one source.
19	Another source is we have a forum where
20	we have online discussions page called "Tire
21	Talk". And there you can write in; you can talk
22	about tires; you can share experiences; talk about
23	problems that you're having.
24	We have a lot of armchair experts, as I
25	like to call them, who share do some research
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on their own and share their own experiences. 1 Once in awhile I cut in to try to set the record 2 straight if it looks like they're going astray. 3 4 And then we do some internal research, 5 as well. We cover these topics. They include 6 readership surveys, focus groups that we've done 7 on tires, and research projects. 8 This is all to figure out what people are interested in. Perhaps figure out ways to 9 10 make our data more useful to them. First, letters. Letters and forums 11 comments from "Tire Talk". They have a 12 13 distinctively different tone. The letters we get, 14 we like to call post mortem. These are generally 15 complaints. Complaints about us in the way in which we presented the data; we didn't provide 16 enough information. Or they can't find a tire 17 18 which we tested and recommend. More likely it's a negative, frustrated, 19 end-of-the-line type of letter to us. They just 20 21 had a problem. They don't feel like they got 22 satisfaction, and they write to us to see if we can help out at all. And this covers anything 23 from tire integrity, to talking about the 24 governments not being responsive to their needs, 25

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to, you know, tire companies just put profit above 1 2 anything else, tire dealers tend to mislead people. Gee, never heard that happen. But those 3 4 are the type of things we get from letters. 5 Now, another, the discussions are 6 decidedly different. They're more reactive in the 7 sense that people are willing to do some research, 8 willing to find an answer, willing to share their problem. Hey, I got a problem with my tire with 9 10 this car; anybody out there, can you help me out. 11 So I find that fascinating from that standpoint. And also those people tend to like 12 13 cars, tend to want to buy the best products for 14 their cars. Whereas the letters, I think at least 15 what I get out of it is they look at cars as appliances. So, two distinctively different 16 17 approaches. 18 Next slide, please. Readership surveys. Think of these as the Nielsen ratings of 19 20 television show ratings, if you will. We do our 21 own analysis of who reads the magazine articles. 22 This gives us an idea of whether or not they found it valuable, whether or not they used articles to 23

25 How, you know, is it a product which we PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

make a tire purchase.

1 tested that they feel that we should retest in
2 future years.

3 So this slide here is interesting 4 because this slide says buyers in the market for 5 tires. And what this means is buyers -- that 6 percentage of buyers that actually use the article 7 to make a purchase.

8 And here the red line is average of all 9 products shown in that monthly magazine. And then 10 the blue line above is tires. People really 11 relying on tire information to make a purchase.

12 Next slide, please. Now going to 13 consumerreports.org, our website. This is an 14 interesting slide. It's a nice presentation of 15 the number of hits that we track, that when people 16 come to our website.

17 If you look at this, the larger the font 18 the more hits. Number one is generally GPS 19 systems. It's just phenomenal. Everybody wants 20 to know about those systems.

21 But historically tires comes in second. 22 And this is not just one month, this has been 23 every month for the last two or three years have 24 viewed the data.

25 Tires, I look at that -- this is

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something where people are really looking all 2 around the web, trying to find as much information before they make a purchase. Because looking at 3 4 them they can't tell how they'll perform.

5 Next slide. Okay, we've also done some 6 market research, too, in order to see what people 7 are interested in, what their buying habits are 8 like.

We did a report about a year and a half 9 10 ago, and I'm just going to cover that in summary. Where do people do research? Well, they rely on 11 the tire dealer 50 percent of the time. Websites 12 13 are used 43 percent of the time. And then can't 14 discount mentioning friends, mechanic, 15 advertising, magazines and even the car dealer. Next slide. Who researches tires? 16 Well, 62 percent of our subscribers say they do. 17 Sixty-one percent in favor of looking for safer, 18 19 high performing tires.

20 People who own high-end cars or spend a 21 lot on tires do a lot of research; 58 percent of 22 those, of luxury sports cars, 72 percent who spend more than \$500. 23

24 Okay, all that said and done, though, less than half, 45 percent only did no research at 25

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all.

2 Next. What websites are researched? 3 Well, typically manufacturer websites, 50 percent of the people surveyed went to those sites. 4 5 Thirty-five percent went to retailer sites. Also 6 32 percent claim to coming to us. And I have to 7 mention there's some very good sites out there 8 through TireRack, Discount Tire and 1010 Tires, provide a lot of information and education on 9 10 tires.

11 Next. Considerations by buyers, what 12 did they look at when they made a tire purchase. 13 Now, you have to be careful with this because when 14 we asked this question sometimes I get the feeling 15 they're trying to tell me something that will make 16 me happy. The view as if they know something, and 17 they'll throw it out. That's fine.

18 But we've done some focus group testing and there are others aside from just asking the 19 question, as well. They're the type of things 20 21 that come up, things like durability. But when 22 you ask about that, well, what do you mean by durability, because it's something that there's no 23 24 rating for durability on a sidewall tire. Nobody has a means of defining what that might be. 25

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But it comes down to things like run-1 2 flat resistance, road hazard resistance, perceived 3 quality, again another thing you can't put your 4 finger on. And so that's the sort of thing that 5 they're looking for when they say durability. 6 Tread life comes up second, generally. 7 And again, they don't say tread life, they'll say 8 I want a longer lasting tire. And in some ways that's almost a durability aspect, as well. 9 10 Wet grip and handling. Stopping 11 distance. Price. They are common things that are often spoken of. 12 13 We did focus group testing. We have 14 groups of women, we had groups of men. And we 15 asked, we went through some thorough questioning. We found out, interesting enough, women tended to 16 do more research than men on tires. I thought 17 18 that was fascinating. Okay. We asked people who made recent 19 tire purchases, okay, what did you get and why did 20 21 you get it. After going all through this, it came 22 down to two things. Price and availability. So, throw all the other stuff out we said, it came 23 24 down to those two factors. 25 Next slide. Ratings, okay. Consumer

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Reports, we have our own rating system that we use
 for everything from testing cars to toasters,
 what-have-you. It's one system, it's one
 template. We use it for everything. It's a five point system.

6 And in the magazine we go from excellent 7 to poor. Interesting enough, when we use the same 8 system, which we do, for special publications we 9 often talk about better to worse, which I tend to 10 like more.

I want to talk about this system because 11 it does have some shortcomings for tires. When 12 13 you think about tires which we test, all season, S 14 and T speed rated models and winter tires. 15 Another subgroup would be performance summer, all season and winter tire counterparts. And then we 16 do truck tires, all season, all terrain and winter 17 18 tires.

We try to take this one rating system
and apply it to all these tires. You don't end up
with much resolution. I'll give you an example.

Take snow traction. If you use this template for snow traction, all winter tires are going to be probably rated five. What I'll call five is our excellent rating.

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All summer UHB tires are probably going 1 to be graded one or poor, okay. All season tires, 2 they're going to be threes. That's it, okay. 3 4 You know, we do the testing and then we 5 report it that way. We haven't told the consumer 6 much that they couldn't have figured out for 7 themselves. 8 So what we do is we do it on a semiglobal basis. We use three different spans to 9 10 cover these three different categories. The other thing I want to point out, 11 too, that's important here is within these three 12 categories we might use different vehicles, 13 14 different sized tire. That all has a direct 15 bearing on the ratings. Okay. Next slide, please. tire tests. We do 16 17 all weather performance tire tests which involves 18 12 to 14 different ratings. We cover subjects 19 such as dry and wet braking, hydroplane resistance, handling, winter grip, wet handling. 20 21 We also do rolling resistance. We use the SAE 22 J1269 test. We also evaluate ride comfort and noise. And we do our own tread wear testing, as 23 24 well. 25 Now, from that, from those tests we

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calculate an overall score. It's a average, a 1 2 weighted average of all those different parameters. Weight with emphasis on safety-3 related items, such as braking and hydroplane 4 5 resistance if it's an all season tire; certainly 6 winter grip comes into play, as well. 7 Okay, next slide, please. Okay. We do 8 rate rolling resistance, of course, but we say use rolling resistance as a tie breaker. We don't put 9 10 a lot of weight into it because we feel it's a value feature, okay. It's not a safety feature in 11 a tire, where our company, our mission is safety 12 13 over other things. So, as such, it gets a 14 relatively small weighting. 15 Why we would do that, too? Well, there's some obvious reasons. Some tires, not 16 all, but some tires do compromise dry and wet grip 17 18 and even tread life for optimum rolling 19 resistance, okay. 20 But the point I want to make here is 21 consumers, they shouldn't be selecting tires on 22 rolling resistance, alone. There are more important things to consider, we feel. 23 Next slide. Okay. This is a good 24 opportunity to show you a cross-section of our 25

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readers and why we provide that in various ways. They want different levels of information.

I would say one type of reader is, he or she is interested in nothing more than the overall score. Don't give me all the intricate details, just tell me which is the best one to buy, okay. And that's where the overall score comes from, of course.

9 Secondly is maybe somebody's interested 10 in a specific suit that meets their needs. An 11 example of this, somebody lives like in Florida. 12 They're not interested in snow traction, but they 13 might put emphasis on dry and wet braking and 14 hydroplane resistance. So they'll look at a tire 15 that meets their needs in that area.

And then there's a group, mostly on the web, they want everything. They want all the data, hardcore data behind the scenes that make up the ratings.

20 Now, I have to tell you, we have done, 21 from time to time we have provided some raw data 22 to people. Even when we explain how to use it, 23 put restrictions on it, put limitations on it, 24 they still misuse it.

25 So it's not a good thing to do because PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

1 it tends to misinform. Even if the person you're 2 giving it to understands it, other people who join 3 into the forum section, they tend not to read all 4 the intricate details about it, and it's misused. 5 Next slide, please. As far as I know 6 there's not too many stores for getting 7 information on tire rolling resistance. We've

8 been doing it for a number of years now. And even
9 at that, I mean this is typical of our readers'
10 type of letters that I'll get. They're still not
11 satisfied.

And as this one reader wrote, I'll just 12 13 wrote what's in quotations here, "Your inclusion 14 of rolling resistance in your tire ratings is 15 helpful, but insufficient. You need to use standardized testing to provide average mile per 16 gallon ratings." "Highlighting this critical 17 18 factor would doubtless improve competition and innovation, as well." And, no, it wasn't Ray 19 20 Tuvell who wrote that.

21 Next slide, please. Okay. Now this 22 gets to the rolling resistance presentation 23 challenges, as I see them. And I'm looking at 24 some of the things that people have wrote in in 25 the past, as well, and some of the misconceptions.

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First and foremost, let's talk about, 1 2 and we had talked about it this morning, rolling resistance force and rolling resistance 3 4 coefficient. This is nice stuff, this is what you 5 need to find ratings. But this is not the sort of 6 data that at least our readers are interested in 7 seeing. It's just going to be too difficult for 8 them to understand it. Okay. Then, again, it gets back, raw data is 9 always misused; they don't read the fine print 10 11 behind it, okay. Something that I do like, you know, 12 which is on the basis of that last letter is 13 14 rating system that is related to gallons of fuel 15 or dollars saved. This is our typical reader. They're looking to buy -- save a buck, save some 16 fuel. Okay. That's great. I'm all for that. 17 Here's the problem I have with rolling 18 resistance. It's a collective savings. Every 19 20 year when we do a rolling resistance test of peer, 21 peer-like tires, we'll take the best tire, the 22 tire with the least amount of rolling resistance, 23 and the worst tire in that program, with the most. 24 And then we'll run our highway fuel economy test on a set of those tires. And I can 25

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tell you, even when we're looking at fairly large differences in rolling resistance of 30 to 40 percent, which is huge in my mind we're only seeing gains of maybe one or two miles per gallon. Again, I think that's a lot but some people are not terribly impressed by that.

7 And this brings to mind what rolling 8 resistance is. It's not something that direct 9 individuals are going to see a huge benefit from. 10 But as a state, as a nation, yeah, we can save a 11 lot of fuel and a lot of energy. They have to 12 understand that.

Next slide, please. Okay. There's been a few rating systems that have been kicked around. There's obviously more that should be considered, as well. I'm just going to talk about these two that I'm familiar with.

One is the EnergyStar system, which has been brought up. Now EnergyStar system exists today. It's used for a lot of products out there. Typically you take the top 20 or so percent within a line that are the most efficient. You give them that award. Okay.

I like it because it's simple, it'sintuitive. It already has good consumer

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awareness. People understand it, or at least they've seen it before. It's not something new.

On the down side of that, on the lows,
it does tend to drive, I believe, consumers to buy
only on efficiency alone if it's got that award.
Okay. Again, that's not something I think people
should consider only. Getting back to other
performance features, I think, are more important.

9 Currency. I'm not sure how this is 10 going to work, but I can share, you know, my 11 experience in rating tires. There are always new 12 models coming out routinely.

13 Let's say you have a standard of 14 excellence up here with the top 20 percent in that 15 category. As new tires come into this, they'll be 16 introduced into that new excellence margin, okay.

What's going to happen to tires that are 17 18 on the fringe of that? Are they going to be dropping out? How are you going to manage that? 19 You have the EnergyStar system award today, but 20 21 tomorrow you may not. I think there could be some 22 confusion there, but maybe all that can be worked out. But I just wanted to make a note of that. 23 24 And then again, you got award for the top 20 percent or so, but what of all the others, 25

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the 80 percent down below. We make no mention of them. We tell people nothing about those tires.

3 So that leads me up to the star system, 4 five stars. I do like that in the sense that it 5 does define all tires. But it, too, I think, has 6 definite disadvantages. And, again, it gets back 7 to can we use one scale to identify all tires. Or 8 are we just going to end up with a bunch of ones, 9 fives, and tires in the middle? I don't know.

10 It does have good awareness, but you 11 know what, the stars, particularly the stars as 12 shown here, they're related to safety. NHTSA 13 already uses them for their testing, even for 14 child-seat testing. So maybe something like fuel 15 economy, fuel pump icons or something would be 16 worthwhile. I don't know.

17 Next slide, please. Okay. Having said 18 all that, this year I'm testing 72 models of 19 tires. And this is the first year I've seen, at 20 least, a couple of tires that have actual labels 21 on the sidewall that would indicate they had some 22 fuel efficiency feature to them.

23 So while we talk about rating, while 24 Europe talks about rating, even the federal 25 government is talking about rating some time in

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the future, tire companies are already ahead of the game. They're rating tires now.

And how to explain this is this is preliminary data, I must stress. We haven't published this yet. But the rolling resistance data was just complete a couple weeks ago. And what I show here is the tire on your left has a fuel gauge and reads full. It's an all season HB rated tire.

10 And what I did is I show in a bar chart 11 form, again it's peer tires, 16 other HB rated 12 tires. And these are averages. And it has 32 13 percent lower rolling resistance. It was 14 interesting to see that.

15 The other tire is a winter tire, and I 16 don't know if you can note it here, but it has 17 something specific on the sidewall, it's not even 18 fooling around with symbols, it says ultra-low 19 rolling resistance on the sidewall of the tire.

And I compared that to its 11 miles of tires within that category. That had only about an 8 percent difference in rolling resistance from the average of those peer models.

A couple points here. I was happy to see that they were both more fuel efficient than

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norm. But it brings up something else, is that there's different levels of efficiency. And so while we tell people that they're efficient, they really don't know how efficient they are, unless we had some standard format. So that's something to consider in developing a grading system.

7 And then the next slide. I can't harp 8 on this enough, and it's been said before by 9 several people already. With any grading system 10 we need an education program for this to succeed, 11 okay.

Pressure, maintenance, it's got to be 12 13 the top priority. People who don't maintain tire 14 pressure, that has a direct relationship on 15 rolling resistance. We have to tell people, particularly if they're going out to buy a fuel 16 efficient tire, that they're not going to get it 17 18 if they don't ever watch the inflation of that tire and maintain it. 19

And secondly, too, and I've gotten some letters on this already, particularly with Prius owner tires, talking to Dan about this later -before, rather, reminded me that when people talk about replacing tires, it generally is they're removing a worn out tire. And they're putting on

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1 a new full tread tire.

Even if it's touted as being a fuel efficient tire, that full tread tire may not be any more efficient than that worn out tire. Or may even be less efficient until it starts to wear.

People have to understand that. We're going to have to tell them that. We're going to have to explain all that. Otherwise I'm going to be getting more and more letters on this subject.

And then, you know, we talked of all the 11 question marks this morning about rolling 12 13 resistance, and I'm just throwing out a few things 14 that come to mind. Load, speed, ambient 15 temperature, rolling time, road texture, looking at the temperature of the road. And you got to 16 look at the vehicle. The vehicle's overall 17 18 efficiency and its alignment.

You know, we think of the tire. It's not a product that can stand alone. It's a component of a system. It's a component of a vehicle. So, you not only have to take care of the tire, you have to take care of the vehicle to get the most out of it.

25 I'll just leave you with that. Thank PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

you very much for allowing me to speak today.

MR. GOTTLIEB: Gene, thank you for a 2 great presentation. This is Adam Gottlieb with 3 4 the Energy Commission. In your professional 5 judgment do you have an idea of what the model 6 might look like? I mean aside from the 7 suggestions you gave. I mean is it a color code? 8 MR. PETERSEN: You mean a grading model? MR. GOTTLIEB: Is it a color code, is it 9 a number? Is it a --10 MR. PETERSEN: Ultimately what I would 11 like is one system universally. We're talking 12 13 about federal government, we're talking state of 14 California, we're looking at the European system 15 that may come out. I would like to see one system only. 16 Because again, it's all about me. I'm going to be 17 18 getting --19 (Laughter.) 20 MR. PETERSEN: -- these letters. And if 21 we end up with one, two or three systems, I'm 22 going to be spending all my time talking about them, making -- trying to learn the virtues, the 23 positives and negatives about these systems. And 24 25 bring them to light for our readers.

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We already see something like this with 1 2 speed ratings, and the temperature rating on a sidewall tire. They're not directly related, but 3 4 they look at similar things. And you try to break 5 that down for people and it's just, it's hard. 6 So, to answer your question directly, I 7 don't have a specific proposal. But I would 8 really like one system, whatever that would be. 9 MR. TUVELL: Ray Tuvell with the Energy Commission. You're not looking at actually a 10 combination of this slide and the next slide after 11 it, because in a way it's combined in my mind. 12 First of all, I think you've touched on 13 14 such a critical point on this consumer education 15 thing. And regardless of the system we come up with, I'm interested in your views of how do we 16 introduce this out there, you know, this concept 17 18 of this subject of energy efficient tire. I mean the mechanism for doing it, and 19 the slide before, for example, stamp it on a tire? 20 21 Just about everybody I've talked to, and I pretty 22 much agree, I don't look at a tire before I but it. You could stamp it on there, but it's kind of 23 a waste for me. And I think it is for most 24 25 people.

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But it raises the question of then how do you get, whatever we come up with, what's an effective means of getting it out there to the consumers.

5 MR. PETERSEN: Yeah. Well, I think it 6 is a challenge. Certainly in some ways I like it 7 on the sidewall tire, but in lieu of point of 8 sale, I'm really fearful of that. Because the 9 people who are behind the counter at point of sale 10 may not be qualified at all to answer these type 11 of questions.

12 So either a label that goes on the tire, 13 you know, a stick-on label when you buy it. Or 14 they tend to fall off. Maybe if you put it, you 15 see them by the time the tires are mounted on the 16 vehicle.

Or maybe a brochure that comes with it, with the tire, to show its placement among all its peer models. And, again, I don't know what this labeling system would be like. Some of that's going to dictate this.

But within that labeling system there has to be a kind of brochure that runs through what the labeling means, and tells the people what can you expect to get out by purchasing this tire

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1 with its energy level.

2 So that's going to be part of it. You can't separate the two. Got to have the education 3 4 and you got to have the meaning behind the rating 5 that you come up with. If it gets lost, it's not 6 going to be meaningful. 7 MR. TUVELL: And one extension of that, 8 UTQG. The current grading system for temperature, traction and tread wear. Do you have -- I mean, 9 10 and its intention was a consumer information program. Different from ours, but the same in 11 that idea we're supposed to use that to get 12 information out there. 13 14 Do you have enough experience along with 15 that to give us some lessons learned? I mean is that a good model for us to build off of or not? 16 MR. PETERSEN: Well, in a November 17 18 workshop they talked about UTQG. I poked my finger into it a bit, to talk about the 19 20 shortcomings, particularly of the temperature and 21 the tread wear portion of that. 22 Let's take the temperature portion 23 first. Most tires are generally graded A and B. 24 Few are graded C, because they're made more robust 25 now. The standard, minimum standard has changed.

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So is it worth having that to begin with? 1 And secondly, we already have the speed 2 rated that tends to relate with temperature 3 4 performance, or temperature resistance. So I 5 think that could be looked at. 6 Tread wear, same thing. We look at 7 tread wear ratings, first of all, nobody 8 understands the index, nobody understands that it's comparative to some reference tire out there 9 10 that's labeled a grade of 100. Okay. The second thing is it's a unit-less 11 type of number. Doesn't correlate to the miles to 12 13 be driven or tread wear warranty or some value 14 like that. So, it's somewhat meaningless. Again, 15 gets back to what people want. They would like to see information in terms of which they understand 16 17 already. 18 Again, we can talk about tire efficiency. It gets all down to miles per gallon, 19 20 dollars saved, at least with our readers. 21 So, anyway, let me just get back to 22 UTQG. This is one of the reasons why we look at tread wear. We do our own tread wear testing 23 24 because we get better resolution than what's on 25 the sidewall tire.

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And that sidewall rating, that's a self-1 2 certification process. The manufacturer just has to meet that level. Doesn't mean that the tire is 3 4 going to exceed that level, but it has to meet 5 that level from a minimum standpoint. 6 So you may not see a lot of resolution. 7 The type of numbers that reside on those tires 8 that compete against directly one another, they all seem amazingly alike. So it might be more of 9 10 a marketing thing at that point. 11 And it's the tread wear rating, the tread wear warranty, excuse me, because that's 12 13 where manufacturers put out money, you know, 14 essentially insuring the tire. And what we see in 15 our tread wear test, which people can use to judge tread life. 16 Yes, Mike. 17 MR. WISCHHUSEN: Gene, thank you. 18 This is Mike Wischhusen with Michelin. To go back to 19 what you just said about UTQG tread wear, I want 20 21 to make sure we understand clearly. 22 Indeed, as most other federal automotive 23 safety regulations, self-certification is the 24 model, which means the manufacturer assures that 25 the tire passes whatever the test may be.

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In the case of the UTQG tread wear, the 1 2 flaw, or the commonly interpreted flaw in the tread wear system is not that it's self-3 4 certification, it's that the regulation is written 5 that the grading is a minimum. The tire must 6 perform at least this well. 7 Okay, so the flaw is not the self-8 certification, the flaw is a minimum regulatory standard. 9 10 MR. PETERSEN: You're correct, I stand 11 corrected, thank you. MR. MEIER: It's Alan Meier. Wonderful 12 13 presentation, thank you very much. I have a 14 question about testing. How many times of each 15 type do you test when you're doing a rolling resistance measurements? 16 MR. PETERSEN: Well, you mean for a 17 18 model? 19 MR. MEIER: Yes. 20 MR. PETERSEN: Okay. Three. Three per 21 model. And what we do is we have a statistical 22 department down there in the Yonkers office. 23 They'll go through the data. They'll use a 24 program to come up with statistical differences. 25 And they'll show them within the five-point system

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1 which we have.

2 MR. MEIER: Are you comfortable with 3 testing three tires as representative of one SKU? 4 MR. PETERSEN: I think comfortable. I 5 mean if anything, for the statistical process, if 6 there is large variability, it's knocked down a 7 bit. Okay. 8 So if a tire in a grouping, the more precise you can get these tires to fit into these 9 10 things, if there's a large variability then there's a larger group of tires that are 11 statistically the same. 12 MR. MEIER: So do you find a large 13 14 variability? Does it seem to be consistent with 15 what the California Energy Commission saw with their variation? 16 MR. PETERSEN: It does vary. I mean, 17 18 and it gets back to, I think, we were talking -you were alluding to it before, in some ways, the 19 20 quality of the tire. 21 Now let me point out. When we do our 22 testing we try to buy tires that are made within 23 the same week of production, same plant. These 24 are replacement tires because that's what we test. We don't test original equipment unless the 25

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1 original equipment is a replacement model, as
2 well.

We can see variability changes, they run the gamut. And, you know, some of that could be just things like how well they control uniformity of the tire, you know.

So, why? I don't know. That's not my
job. But if there is a large variability it's
going to show up in how we place the tire through
the statistical analysis.

11 MR. MEIER: Back to the label, you got a 12 slant on labels which I thought was useful because 13 it shows the pros and cons on the rating systems.

Another part of this, which I think shows up in all these labels, is the extent to which -- let me not call it a label, let me call it a rating system like you did.

18 It's not only the consumer response, but 19 the manufacturer response to how they will 20 basically adjust their production to in some way 21 coincide with the rating system.

And I wondered whether you had any comments about that, whether maybe EnergyStar or a rating system might, with the stars, the five ratings, might -- which might the manufacturers

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respond to -- I'm not sure if I want to use better, but differently. Do you have any sense 2 of --3 4 MR. PETERSEN: I think that's something 5 you would have to ask them here. My concern is 6 not so much the manufacturers, as much as it is 7 how the consumers might view this. 8 And so I showed these two because these are two systems that consumers are somewhat 9 familiar with already. 10 But, again, this is a question that the 11 tire makers are --12 MR. MEIER: Yeah, another rating system 13 14 you might have put up there is the FTC label --MR. PETERSEN: Sure. 15 MR. MEIER: -- for all appliances. And 16 then, also, of course, the automobile label, too. 17 18 There are other kinds of ratings systems --MR. PETERSEN: Yeah, but --19 20 MR. MEIER: -- that could have --21 MR. PETERSEN: -- I know these are two 22 that we have been talking about. And I just 23 wanted to run through these. Because I haven't 24 seen a rating system yet that works perfectly for 25 this.

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And more to the point, you know, we were 1 2 talking this morning about data down to the hundredth of a place, and yet keep in mind that 3 4 we're looking at large differences, huge 5 differences in rolling resistance that has to be 6 there for this to be meaningful. 7 So, you know, it gets back to a system 8 that is really going to show the consumer, yeah, it makes a difference. If you tell me you're 9 going to use a five-point system, and you give it 10 11 an excellent five-point star for tire efficiency, and I put it on my car and I don't see a 12 13 difference, that system has failed. 14 MR. MEIER: Yeah, in the November 15 workshop it was clear that from all the presentations and discussions that the consumers 16 cannot be required to make a complicated decision 17 about energy efficiencies. 18 19 MR. PETERSEN: That's right. MR. MEIER: They just were severely 20 21 limited in the calculation --MR. PETERSEN: Well, let me add to that. 22 23 Who looks at it right now? The hybrid owners, 24 particularly the Prius owners. Okay. And anyone else, when gasoline goes above \$4 a gallon. 25

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1 That's it.

You know, I think it's innovative that 2 3 some tire companies came out with some special 4 rolling resistance tires. And there's countless 5 other -- there's a number of others that have done 6 so in a route of showing how well their tire 7 performs against peer tires in the literature. 8 That's wonderful stuff, but right now people don't care about it as much when gasoline 9 10 is relatively cheap. 11 MR. MEIER: Thank you. MR. GUINEY: Dan Guiney, Yokohama. 12 Gene, you wouldn't call the five star a 13 14 categorical rating system. And do you also consider the one to five, or best, better to worst 15 a categorical rating system? 16 MR. PETERSEN: I believe so, yes. 17 18 MR. GUINEY: And --MR. SPEAKER: Could you get closer to 19 20 the mic? 21 MR. GUINEY: I'm sorry. In case of your 22 categorical rating system, you mentioned you do rolling resistance testing. And your statistical 23 24 department, based on your categorical system, Consumer Reports has decided where these 25

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boundaries fall between your categorical system.

2 MR. PETERSEN: That's right. MR. GUINEY: Have you given your readers 3 4 any relationship to what they can expect in terms 5 of fuel economy? 6 MR. PETERSEN: And I thought I covered that, but that's a common question. We normally, 7 8 in the past sometimes we've given the data without doing a fuel economy test. 9 10 So typically, like last year, as an 11 example, we presented the data and we did a fuel economy test between the best and the worst. And 12 13 we gave them a bracket, this is what you can 14 expect if you bought the best tire versus the 15 worst tire within that group. Just to give them a sense that this is 16 not a huge thing. This is not going to change 17 18 your Expedition into a Prius, okay. But it's 19 going to help. Okay. 20 And, in fact, you know, if you look at 21 that span, one to two miles per gallon, most of 22 the time that's from the best to the worst, most 23 of the time you're buying a tire that's probably 24 in the middle. So you might see something that's negligible. In fact, you won't realize any 25

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savings unless you're a pretty good bookkeeper and 1 look at your monthly consumption of fuel. 2 And this is where it gets back to, I 3 4 believe, people have to understand, yes, they can 5 help themselves out; they might save a few hundred 6 dollars a year by going to lower rolling 7 resistance tires. 8 But the big bang for the buck is if everybody goes to low rolling resistance tires, 9 10 what we can save as a state and a country. You know, that's where the real savings are. 11 MR. GUINEY: So you've attempted to 12 13 describe the lowest category delta to the highest 14 category. Did that have anything to do with the 15 risk of misclassifying in the intervening categories? 16 MR. PETERSEN: No. 17 18 MR. GUINEY: Did any of the proper 19 categorization or dropping them in the right 20 buckets go -- was that part of the process in the 21 statistics? 22 MR. PETERSEN: Yeah, that's the statistics of it through the -- program defines 23 24 the buckets for us. And like you said this 25 morning, don't ask me too many questions about the

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statistics, that's not my job. But they provide 1 2 the bins for me to utilize. MR. GUINEY: And there was a question 3 4 this morning that maybe you can also answer. Are 5 the bin widths constant width that they recommend 6 or not? 7 MR. PETERSEN: I can't answer that. 8 That's a good question. I'm not -- it's all based on individual statistics of the variability, of 9 the individual models versus -- well, of the 10 individual models. 11 MR. GUINEY: Thank you. 12 13 MR. AHUJA: This is Kamal Ahuja with the 14 In the letters to Consumer Report, can you ARB. 15 tell us what are the top few gripes people have about tires that maybe the tire manufacturers can 16 17 consider those parameters and decide whether they want to compromise on those issues or not? 18 19 MR. PETERSEN: Again, I mean, let me just clarify that question. You're asking are 20 21 there other characteristics that people are 22 concerned about? 23 MR. AHUJA: No. I'm asking is from all 24 the letters that Consumer Reports receives, plus 25 the forums that you have online, would you be able PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

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to tell us what the biggest gripes are of consumers --

MR. PETERSEN: Oh, sure, --3 4 MR. AHUJA: -- when it comes to tires? 5 And maybe the tire manufacturers may or may not 6 consider those parameters when they --7 MR. PETERSEN: I think one of the things 8 that comes to mind is something that's relatively new, a newer trend. Particularly on newer 9 10 vehicles. It's not a tire problem, per se. It's 11 an auto manufacturer problem. We're seeing too many tire sizes out 12 13 there. And there's evolution to going to larger 14 and larger size tires on vehicles. 15 So, you're looking at people are often writing, I can't find that tire; I can't buy that 16 tire because it's not available in my size. Okay. 17 18 And this is another subject matter which 19 I think, this is why we like the 4/32nd rule for when tires approach 4/32nds of wear versus 20 21 2/32nds. The 4/32nd gives them some time to start 22 thinking about shopping for new tires. Because they're going to need that time to get tires 23 24 ordered for their car. Okay. 25 And that's been a real big issue,

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particularly with late model cars. And I see that
 just getting worse.

When I started in the tire business some 30 years ago we had like 60 sizes, okay. We're up 5 to over 312 now. Okay. That's incredible. You 6 can't expect tire dealers to carry all those sizes 7 and all those models. It just can't happen.

8 Some sizes are only unique to specific 9 cars. So people are limited to what they can buy, 10 what's available for their car. I think that's 11 the key one that I'd like to leave you with.

But, maybe another issue. It's come, from time to time, run-flat tires. And, again, this is one of those things that people like the concept, they like the security. Run-flat tires work. But they don't like the cost of buying replacements. They don't like the limited mobility of some of the run-flat tires.

19They always use the example, oh, yeah,20that's great that it's got a 50-mile range when21it's a flat -- mode condition. But what happens22if I live out in Utah. They always do this to me.23And, you know, I'm 200 miles from the nearest gas24station. Well, yeah, then you got a problem.25(Laughter.)

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MR. PETERSEN: But, you know, that's 1 another feature that it does work well. But you 2 have to understand its capabilities and 3 4 limitations. Okay. 5 MR. AHUJA: Thanks for your response. 6 MR. PETERSEN: All right. 7 DR. WADDELL: Walt Waddell with Exxon 8 Mobil. One thing I want to point out, if you use the CEC rolling resistance data versus the 9 statement that you use, you'd only buy replacement 10 tires. 11 So when you replace the replacement 12 13 tires you're going from OE to replacement. And 14 then in replacement there's also a range. So that 15 initial changeover is a considerable first-time penalty --16 17 MR. PETERSEN: That's correct. 18 DR. WADDELL: -- wider than what you might actually see replacement only --19 20 MR. PETERSEN: You might see that, yeah, 21 right. 22 DR. WADDELL: Okay. MR. PETERSEN: But I think, too, one of 23 24 the things that I find interesting, I showed a 25 slide of those two tires that had fuel efficiency

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labels on them. I find it remarkable that tire 1 2 companies are looking at that as a way to sell tires. That's something new that we haven't seen 3 4 before. 5 So it'll be interesting to see how that 6 falls out. 7 Okay, thank you very much. 8 (Pause.) MS. NORBERG: All right. Well, thank 9 you very much, Gene, for the great overview of a 10 11 complicated marketplace. And our next presenter is Tim Robinson 12 from Bridgestone. I think Tim will build on a lot 13 14 of the context that Gene has discussed, and then 15 give some of our perspectives and our thoughts on how a rating system might work. 16 So, Tim. 17 18 MR. ROBINSON: Okay, thank you, Tracey. As Tracey mentioned, I'm Tim Robinson. 19 I work for Bridgestone; 25 years experience, 20 21 primarily in product development and testing. I'm 22 here today representing RMA and the RMA members. My part of the presentation is tire 23 24 efficiency consumer information. And really I'm going to break it down into two parts. The first 25

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is rolling resistance coefficient versus rolling 1 2 resistance force. There's been a lot of dialogue on this over the last several hours as to which is 3 4 the best basis for a rating system. 5 Then after that we'll look at the RMA 6 rating system proposal. 7 So, next slide, please. Before we go to 8 those proposals, what we'd like to do is just rehash a little bit some of the requirements of 9 10 AB-844. Three main components at least of the 11 25771. One is to develop a database of the energy 12 13 efficiency of a representative sample of tires 14 sold in the state. 15 The second is to develop a rating system that will enable consumers to make informed 16 decisions when purchasing tires for their 17 18 vehicles. And this is key -- we'll hit this a little bit later -- for their specific vehicle. 19 20 The third item is based upon the test 21 procedures pursuant to A and B, and the rating 22 system pursuant to B, develop requirements for tire manufacturers to report to the Commission 23 24 energy efficiency of replacement tires sold in the 25 state.

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Next slide, please. So basically what 1 2 makes a good rating system. So these are the criteria that the RMA developed, which we came up 3 4 with, comprise a good rating system. 5 First of all, is it easy to understand. 6 Does it offer consumers a choice among products 7 appropriate for their vehicle. And this becomes 8 key later on as you'll see. 9 When we say appropriate we mean the tire that is applicable to the vehicle which carries 10 11 the load, the proper speed rating, so on and so forth. 12 13 Does it lead consumers to suggest a tire 14 choice that is proper to the vehicle. Can it 15 provide information about potential fuel efficiency. In addition to this, as Gene pointed 16 17 out, there's other criteria that need to be considered when purchasing tires. Namely 18 attributes like tire safety. 19 20 So, is additional information provided, 21 safety, durability, relating potential tire 22 performance tradeoffs. And there are some 23 tradeoffs associated with trying to optimize a tire for fuel efficiency, as you'll see a little 24 25 bit later.

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And last but not least does it foster 1 2 competition among tire manufacturers to improve tire efficiency. And the answer to that is yes; 3 4 we'll go through that a little bit later on. 5 Next, please. So, first of all, the 6 basis for a rating system. This is where we'll 7 get into the details of what's the best way to 8 base the rating system. Is it rolling resistance force, or the rolling resistance coefficient. 9 10 We've designated rolling resistance coefficient as RRC, and rolling resistance force 11 as RRF. 12 13 Next, please. Just a few more 14 definitions. This is really a repeat of some of 15 the information that some other folks have shown, but rolling resistance is the energy dissipated by 16 17 a tire per unit of distance traveled. The rolling resistance is typically measured on a 67-inch 18 diameter wheel. There's a radial load applied to 19 the tire similar to the vertical load associated 20 21 with the weight of the vehicle. And we measure 22 the force required to keep that tire rolling at a constant speed, load and inflation. That would be 23 24 FC. 25 So the rolling resistance force -- I'm

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sorry, Fx, rolling resistance force, FX, at the 1 2 axle in the direction of travel required to make the tire roll under a specific load, speed and 3 4 inflation pressure -- this is under stage A 5 conditions -- is defined as rolling resistance 6 force. 7 Now coefficient is that same 8 measurement, but it's divided by the radial load. So we get an index as to how the rolling 9 resistance force applies to the tire as indexed to 10 11 the load carrying capacity of the tire. Next slide, please. We took a look at 12 13 our databases and internal databases at 14 Bridgestone. We looked at over 10,000 pieces of 15 data. And we've actually correlated load index, which to you folks means tire load capacity. The 16 higher the load index, the more load the tire can 17 18 carry. On the left-hand vertical axis we have 19 20 rolling resistance force in pounds. And on the 21 right-hand vertical axis we have the rolling 22 resistance coefficient in pounds, as well. 23 What you can see here is the relationship of rolling resistance force related 24 25 to load versus rolling resistance coefficient

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1 related to load.

2 The bottomline is rolling resistance coefficient is relatively flat and insensitive to 3 4 load capacity or load index; for rolling 5 resistance force is highly sensitive to load 6 index. So this will play out here in the next few 7 slides. 8 Next slide, please. So what we've done, that was 10,000 datapoints. We've taken three 9 case studies, and this is actual SAE J1269 data on 10 11 three specific tires. The first one's a P205/50R16, SAE J1269 12 13 test on this data is at 35 psi. What you can see 14 here is the rolling resistance coefficient for 15 this particular tire, relatively flat and constant, with changes in percent load. 16 17 The rolling resistance force, however,

18 is highly dependent and highly sensitive upon load 19 carrying capability.

20 Now, what you see is when we report 21 numbers, for example we've used the SAE J1269 22 standard test condition to report a rolling 23 resistance force number of coefficient number. 24 That was always taken at 70 percent load. 25 Now, this is going to come into play a

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little bit later here, but say, for example, we 1 2 put this tire on a vehicle which had a position load of 1000 pounds. You can see where the 1000-3 4 pound load would line up relative to the percent 5 load, carrying capability of that tire would be 6 about 85 percent. 7 Next slide, please. Sure, go ahead, 8 Ray. 9 MR. TUVELL: A question. Ray Tuvell 10 from the Energy Commission. Just a couple clarifications. 11 On the J1269 test that you used here, 12 13 did you use multipoint? Or did you actually test 14 this tire at three separate loads? 15 MR. ROBINSON: This is a multipoint 16 regression. MR. TUVELL: So, multipoint regression. 17 18 Okay, good. I wanted to clarify that. And then also what conclusion are you 19 drawing on the rolling resistance coefficient? 20 21 Are you claiming that it, in fact, is a constant number across all loads on this tire and on the 22 other ones? Or is, in fact, there some 23 24 variability? 25 MR. ROBINSON: On this tire here you see

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it's relatively constant. Okay. Now, that's not 1 2 the same for every tire. Now, we have some examples that we can show you later where it's not 3 4 exactly flat. It may be -- there may be 5 decreasing a little bit. But for the most part, 6 on the examples I'm going to show you it's 7 relatively flat and insensitive to load. 8 MR. TUVELL: The reason I bring this up because I think that there is some confusion on 9 10 this issue. In fact, just let me mention that in the RMA letter of March 3rd where this originally 11 came up, and there's some comments in there that 12 13 said something about the Energy Commission 14 proposal of RRF. 15 I mean there was very -- let me know when you hear an Energy Commission proposal, 16 because I think I would have known about it. 17 The 18 Energy Commission has not made a proposal on RRF 19 or RRC, either one. Let me clarify that. 20 What has happened on this issue, for 21 everybody's proper understanding, is some 22 questions have been raised about uncertainties of RRC. Okay. We had been led to believe that RRC 23 24 was, in fact, a constant for tires. And some

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NHTSA studies have suggested, no, it's not.

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MR. ROBINSON: Well, let me clarify 1 that, Ray. I think I remember what you're talking 2 about. Riley here, and some of the folks at VTRC 3 4 have indicated, and they are correct, that rolling 5 resistance coefficient is not linear when you get 6 into the very low load carrying capabilities of 7 the tire. 8 For all practical purposes for the range for which we use tires in the U.S., between about 9 10 50 percent and 100 percent of the load capacity of the tire, it is linear. 11 MR. TUVELL: Okay. And see, that's what 12 we're trying to get some grasp of. Because we 13 14 haven't seen this data before. 15 MR. ROBINSON: Right. MR. TUVELL: As far as -- I mean there's 16 not a lot of J1269 multipoint data out in the 17 18 public domain. And there's not a lot of people using linear regression to figure out RRC at 19 20 different levels. 21 And so up to this point it had been 22 presented to us as a constant, you can count on it. And then till people started looking at it a 23 24 little closer, and said, well, it's not a 25 constant.

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Now, so what happens is it raises the 1 question of well, then if it's variable, how 2 variable is it. Is it nearly constant, or does it 3 4 vary up to 10 percent over the 50 to 100 percent 5 load --6 MR. ROBINSON: No, it's nearly constant, 7 within the load capacity of the tire from 50 to 8 100 percent. 9 MR. TUVELL: Yeah, and so that's one of the points I really wanted to stress here. I 10 think there's been a lot of misunderstanding of 11 what is the disagreement, or what's the issue 12 13 here. And it is we haven't seen enough RRC data 14 over separate loads to have this level of comfort. 15 And that it's simply been assumed in the past that it's a constant, it's a constant, and 16 17 people started raising the question. 18 MR. ROBINSON: Good point. No, the data that Riley here, and some of the folks at VTRC 19 presented, it shows nonlinearity, but that's due 20 21 to the fact that they were in the load range of 22 the tire, the percent load capacity of the tire was much lower than what would be used in 23 24 practical applications. 25 Okay, so this is one tire. This is a

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1 205/50R16.

Let's go to the next slide. Now this is an up-size tire. This tire is bigger, obviously. It's a 215/60R16; same scenario where the rolling resistance coefficient is constant, then the practical application of the usage of the tire, the rolling resistance force is sensitive to, highly sensitive to load.

9 But what you see here, these are the 10 conditions in orange that would be reported for the standard SAE J1269 reporting format. But, if 11 we take the same tire and apply it to the same 12 13 vehicle that we had the previous tire applied to, 14 which has a 1000-pound axle load, the position 15 we're putting it on, you can see now that the blue line is much lower on the percent load capacity 16 17 that the tire would carry.

18 So let's go to the next slide, please. Third example, and this is a 225/60R16, a bigger 19 20 tire yet. So we have small, medium and large. 21 Same scenario, but you can see now the additional 22 shift of the 1000-pound load on this tire, 23 relative to its percent load carrying capability. 24 So, we go to the next slide, I think this will help illustrate the point we're trying 25

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1 to make.

2 Now, what we have on this slide here, this is case study one. This is taking those same 3 4 three tires we looked at previously. And based 5 upon these load indices this is 86, 94, 97, which 6 is typically outside the practical range that you 7 would see for a given vehicle, which we'll get 8 into in a second. 9 This is now applied rolling resistance force in pounds versus percent load. Now, the SAE 10 11 J1269, if you look at the rolling resistance force based proposal, all those numbers would be 12 13 reported at the 70 percent load condition. 14 And these are the numbers that you would 15 get if we would label those tires based upon using that rolling resistance force proposal. You'd see 16 a 9.93 for the smallest tire, and a 13.06 for the 17 largest tire. 18 So that would lead you to believe that 19 the smallest tire would be the most energy 20 21 efficient. 22 However, if you take these same tires 23 and apply them all to the same vehicle, they all 24 see the same radial load, same Fz load, if you take that and then you apply that 1000-pound load, 25

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and you look at where that falls at on the curves, on the percent load for each of these specific tires, the rolling resistance force level you get is in reverse of what you would see if you used rolling resistance force.

6 So rolling resistance coefficient for a 7 given vehicle, which is mandated in AB-844, using 8 rolling resistance coefficient, I'll get to in a 9 second, but rolling resistance force at 1000-pound 10 vehicle load can be misleading and actually a 11 reversal, if you use the rolling resistance force 12 J1269 as an indicator.

Now, however, if you look at the RMA proposal, which is looking at the SAE J1269 rolling resistance coefficient, at 70 percent load you can see the rank order here, the kilogram/tons lines up almost exactly with what the vehicle owner would see on their specific vehicle.

So, using the rolling resistance force based proposal can lead to misleading applications of tires to the vehicle and the end user would not see the expected results. However, using the RMA proposal of rolling resistance coefficient you would get the exact rank order is what the consumer would see on their vehicle.

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MR. POPIO: Hey, Tim, excuse me. 1 Jim Popio, Smithers Scientific. 2 MR. ROBINSON: Yeah, Jim. 3 4 MR. POPIO: On that, is that because 5 you're doing 70 percent of the load, you're not 6 calculating your regression at the same load, 7 correct? 8 In this example you're running 70 percent of the match load of the tire, right? 9 10 MR. ROBINSON: That's correct. MR. POPIO: Okay. What would happen if 11 you ran -- if you put the same load in for each of 12 the tires, like 500 pounds or something? How 13 14 would the rolling resistance force rank? MR. ROBINSON: That's what we did on the 15 second, in the second column, the one that's 16 highlighted in blue. 17 18 MR. POPIO: Okay, so you picked the regression, you put 1000 pounds in. Is that what 19 20 that is? MR. ROBINSON: Yes. 21 22 MR. POPIO: Okay. All right, thanks. MR. ROBINSON: Okay. 23 24 MR. TUVELL: Ray Tuvell with the Energy Commission. I wanted to get back to a conclusion 25

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1 that you reached, to see if you and I have a
2 proper understanding about the application of that
3 conclusion.

4 Your conclusion about saying that RRC is 5 the proper unit for comparing these tires and RRF 6 isn't is contingent on the fact that these are 7 separate load index tires, correct? In other 8 words, if we were comparing all tires on the same 9 load index --10 MR. ROBINSON: Right. MR. TUVELL: -- then it wouldn't matter, 11 right? 12 MR. ROBINSON: That's correct. 13 14 MR. TUVELL: RRF and RR -- okay. And so 15 I just wanted to make sure we have that understanding, because you seem to imply that one 16 is right and one is wrong. That's not --17 18 MR. ROBINSON: If you're comparing the 19 exact --20 MR. TUVELL: -- all the cases. 21 MR. ROBINSON: -- same load index, Ray, 22 then they're the same thing. Rolling resistance force and rolling resistance coefficient are the 23 24 same thing. So. 25 MR. TUVELL: Good, good. And then so

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let me go to the other point then, because -- and 1 I don't know the answer to this, and I hope 2 somebody will help us. 3 4 I think this is an interesting analysis 5 from the perspective of the consumer that would go 6 out into the marketplace and say, I'm interested 7 in any number of different sizes of tires as long 8 as they fit my wheel. 9 MR. ROBINSON: Yep. 10 MR. TUVELL: Do you have a sense of how 11 many percent of consumers fit in that category versus consumers that are essentially saying I 12 13 only want the same size tire I got now. I mean, that's it, give me that tire. 14 15 MR. ROBINSON: I'd have to probably defer to, I don't know, maybe Dan or Gene. I know 16 there are --17 18 MR. PETERSEN: May I make a statement on that? 19 MR. ROBINSON: Sure. 20 21 MR. PETERSEN: We recommend consumers 22 stay with -- we recommend that consumers stay with the same size tire that came on the vehicle. 23 24 Follow the placard that's on the side of the 25 vehicle in the door jamb area.

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We don't tell them to deviate from that. 1 2 I mean you could go up. Certainly you can't go down and have an overloaded situation. But still, 3 4 we don't recommend that they vary off of that. 5 MR. ROBINSON: But there is a 6 significant number of folks who do want to up-7 size. And they do want to go with a bigger tire. 8 So, I don't know, Dan, if you want to address that or not. 9 10 MR. TUVELL: Go ahead, Dan. MR. GUINEY: Yeah, I do believe, and I 11 have heard people state, I don't have the data, 12 13 that a large, a fairly large percentage of people 14 go with exactly what the placard specification 15 was. And it is true that people plus-size. 16 But the problem that comes in with plus-sizing is 17 18 that load index has to be checked. In a lot of calls to our call center -- I also have the call 19 20 centers that report to me at Yokohama -- we get 21 questions about well, my 94 in place of my 97 in 22 an up-size situation still handles the load of the vehicle, even though the 08 manufacturer placard 23 24 says something else. 25 And that's the one that we -- when we

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talk about inappropriate selection, that is a classic inappropriate selection for us, and we have to deal with it.

4 MR. TUVELL: Of course, the reason --5 let me clarify the reason I'm bringing thus up. I 6 didn't bring it up for the sake of disagreeing 7 with you.

8 I wanted to bring it up in the context of what's going through our minds. If the vast 9 10 majority of consumers in the tire marketplace are 11 looking for essentially the same size tire they have right now, okay, then I think we just agreed 12 that well, RRC, RRF, either one will work for 13 14 that. They'll get the same rank order of tires. MR. ROBINSON: That's correct. 15 MR. TUVELL: Okay. And so the 16 17 circumstance where RRC seems to have a specific 18 application that RRF would be misleading is 19 exactly the one you gave here. I certainly agree. 20 In other words, you start comparing different load index tires. 21 22 MR. ROBINSON: Right. MR. TUVELL: Okay. And so I just wanted 23 24 to share that observation from this content. We see that and we understand that. Okay. We 25

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1 understand that.

2	And so I don't want there to be any
3	misunderstanding in our mind about that, okay. Or
4	your minds about that.
5	MR. ROBINSON: Well, as you'll see a
6	little bit later, Ray, there are some other
7	reasonings for going with rolling resistance
8	coefficient. But we'll get to those in a second,
9	so.
10	Okay, so this is a hypothetical
11	situation. Now we wanted to bring it down to a
12	more practical basis.
13	Can we go to the next slide, please.
14	Now, this does happen in the industry, and we
15	picked three case studies looking at a Toyota
16	Corolla, a Chevy Malibu, and then a C-1500 4x2, I
17	believe.
18	And these are base and option size tires
19	on the 2007 Toyota Corolla. The exact same
20	situation occurs. Now, this is a possibility,
21	and, in fact, I'm sure there's been cases where
22	people have asked to up-size, going from the
23	185/65R15 up to the option size, 196/65R15,
24	because obviously if it was a base and option size
25	tire they'd both fit on the vehicle.

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1 Of course, we would never advocate going 2 from the bigger tire to the smaller tire because 3 it will not carry the load. So that's a safety 4 issue.

5 But, again, in this case, looking at 6 rolling resistance force based system, the smaller 7 tire would indicate 7.43, the larger tire 7.97. 8 But applying these at the same vehicle load, you 9 get the reversal. In actuality you'll get the 10 benefit by putting the bigger tire on the vehicle 11 when it comes to rolling resistance force.

Now, we looked at this one at both 35 and 30 psi and the relationship holds true. And analogous to the first case study, the RMA proposal using rolling resistance coefficient lines up exactly and gives you the exact rank order as if you would apply these tires to the same vehicle.

19Okay, next slide, please. Back one.20The same thing, we did the same thing with the21Malibu. The exact same situation holds true.22I'll not go into this in a lot of detail. Again,23rank order for the RMA proposal using rolling24resistance coefficient. If you would upsize on25this particular vehicle, this is the base and

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1

option size, so an entirely believable and practical situation of upsizing on a Malibu, rank 2 order using RRC is better than using rolling 3 4 resistance force in this scenario.

5 One more, please. The last is the Chevy 6 Suburban. Not going to get into this in a lot of 7 detail. But there are some folks who buy 8 Suburbans with P-metric tires and want to upsize to an LT-metric size tire. And they can do that. 9 10 And then again you'll get the exact same 11 relationship using the RMA-proposed rolling resistance coefficient as an indicator, as opposed 12 13 to the SAE J1269 rolling resistance force as an 14 indicator.

15 Next slide, please. So, I've tried to summarize all of this. And all this does is just 16 17 take the rolling resistance force based proposal and compare that to the same tires applied on the 18 same vehicle, whether it be the Corolla, Malibu or 19 20 Suburban.

21 And really this just summarizes it comes 22 to the same conclusion that the RMA proposal of using rolling resistance coefficient for swapping 23 24 out sizes or going with a base versus an option size is a better indicator rank order predictor 25

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1 2 than rolling resistance force for fuel efficiency for consumers.

Okay, next slide, please. So in 3 4 summary, as far as rolling resistance coefficient 5 versus rolling resistance force. The RMA 6 recommends using rolling resistance coefficient as 7 the basis for a fuel efficiency rating system. 8 It's more accurate than rolling resistance force in providing the consumer with fuel efficiency 9 10 information, and direction of choice for their vehicle, we're looking at different tire sizes. 11

12 It offers consumers a choice among 13 products appropriate for their vehicle. It also 14 lends consumers to select the tire choice that is 15 appropriate from a fuel efficiency standpoint. 16 And also, as I mentioned before, we always go from 17 the lower to a higher load index to make sure that 18 the tire will carry the load.

19Last point. The recommended ISO 2858020test procedure for fuel efficiency rating is based21upon rolling resistance coefficient also. So the22lab alignment is based upon rolling resistance23coefficient. And the data quality requirements24for repeatability among machines for a candidate25lab versus a reference lab is all based upon

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1 rolling resistance coefficient.

2	Those are all points and positives
3	leaning towards rolling resistance coefficient as
4	opposed to rolling resistance force.
5	Okay.
6	MR. TONACHEL: This is Luke Tonachel
7	from NRDC. A quick clarification. When a
8	consumer uses a different tire in the examples
9	that you provided, are there any other changes to
10	the vehicle that have to be made in order to do
11	those tire choices that you used as examples?
12	MR. ROBINSON: Well, the only minor
13	issue would be wheels. And we looked at the wheel
14	weight of a base tire versus an option tire.
15	They're within a couple pounds, which has no real
16	significant impact upon the results. So, other
17	than that, no.
18	MR. TUVELL: Ray Tuvell with the Energy
19	Commission. Tim, on your last point there, I just
20	want to clarify one thing.
21	So, in the ISO 28580 test protocol, as
22	you well know, the first number that's calculated
23	is the output of that test protocol is RRF,
24	agreed?
25	MR. ROBINSON: That's correct. Yes.
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MR. TUVELL: Okay, so I mean ISO 28580 1 2 doesn't dictate the need to have an RRC rating system. You're going to have RRF and RRC both, if 3 4 you want it. It doesn't really matter. 5 MR. ROBINSON: You have -- you're right, 6 Ray, you have to measure RRF to calculate RRC. 7 MR. TUVELL: Okay, I just wanted to make 8 sure that there's no absolute must relationship between 28580 and RRC. 9 10 MR. ROBINSON: Well, it's just that the basis for lab alignment is based upon rolling 11 resistance coefficient. 12 MR. TUVELL: Oh, yeah, no, I know that. 13 14 But I think you and I are agreeing that you first 15 got an RRF number, and then you simply divided it by load to get RRC. It's a simple mathematical 16 thing; it's not a process problem or use of units 17 18 or anything like that. 19 MR. ROBINSON: That's the definition, 20 correct. 21 MR. TUVELL: Great. Thanks, Tim. 22 MR. GUINEY: The one thing in ISO 280--23 whatever, MR. ROBINSON: 28580. 24 25 MR. GUINEY: -- 28580, that is specific

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1	to rolling resistance coefficient was the
2	repeatability number. Because if you don't use a
3	coefficient then we don't have to publish a number
4	of different scenarios under which force
5	repeatability would have.
6	Because if you don't use an index then
7	you're in big trouble when you're trying to
8	specify the repeatability requirements of a
9	machine.
10	MR. LAMBILLOTTE: Bruce Lambillotte with
11	Smithers Scientific.
12	MR. ROBINSON: Yeah, Bruce.
13	MR. LAMBILLOTTE: Tim, I'm looking at
14	some data that we had generated where we were
15	working with tires from the same manufacturer, and
16	they're actually from the same design. And to a
17	large extent, it's supporting what you're saying.
18	It's showing that as weight goes up
19	there's a correlation when you look at this whole
20	range of sizes, when you see as weight goes up
21	we're seeing higher and higher rolling forces, but
22	we're seeing lower and lower rolling resistance
23	coefficients.
24	When you look at these tires that are
25	heavy, that have high rolling forces, but low
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rolling coefficients, is any actual fuel economy 1 2 getting done to support the fact that they're better for fuel economy? 3 4 I'm not talking rolling resistance 5 testing, I'm talking actual fuel economy testing. 6 MR. ROBINSON: Well, I'm not sure what 7 you're comparing. It sounds like apples to 8 oranges because you got tires that have a higher weight and a higher inherent rolling resistance 9 10 coefficient. And you're looking at the slope of 11 that curve versus something that's a little bit different that has a lower weight. So, like I 12 said, --13

14 MR. LAMBILLOTTE: Oh, I'm not confusing 15 it at all. I'm looking at two charts that have inverse correlations that have pretty good 16 relationships. These are all tires from the same 17 18 manufacturer; these are tires of the same design. 19 Where I'm looking at increasing weight has a 20 pretty high correlation to higher rolling forces, 21 but higher weight is inversely related to the 22 rolling resistance coefficient.

And I'm not arguing that this is bad for rolling resistance, what I'm really asking is have these kind of relationships really been looked at

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from an actual fuel economy testing. Because we 1 2 haven't done that and maybe you have. MR. WISCHHUSEN: Bruce, this is Mike 3 4 Wischhusen, Michelin. Just to clarify your 5 question, you're looking at different sizes within 6 a tire line? 7 MR. LAMBILLOTTE: That's correct, --8 MR. WISCHHUSEN: Okay, so --MR. LAMBILLOTTE: -- different load --9 10 MR. WISCHHUSEN: Right, so the only 11 valid fuel economy comparison would be between different tires that fit the same vehicle. And in 12 13 that case, that's precisely the case Tim has gone 14 through. The larger tire with the larger load 15 capacity will operate at a lower percentage of its total load, and therefore have a lower rolling 16 force which would give better fuel economy. 17 18 So, you can't compare -- you can't ask the fuel economy question between two tires that 19 20 will not fit on the same vehicle. 21 MR. LAMBILLOTTE: I agree with you. But 22 if you start looking within tires that fit on the same wheel and can be mounted on the same vehicle, 23 24 we also have had some reversals in direction, and increasing rolling forces, but reduced rolling 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

1 resistance coefficients.

2 That's where my interest lies. MR. ROBINSON: Well, I don't know if 3 4 we've answered your question, Bruce. But maybe we 5 can have an offline dialogue on that one. 6 MR. LAMBILLOTTE: That would be good. 7 MR. ROBINSON: Okay, next slide, please. 8 Okay, so now we're moving from rolling resistance force versus rolling resistance coefficient into a 9 rating system. 10 So the RMA proposal for a rating system, 11 first of all, we're looking at the NHTSA 12 13 StarsOnCars program. Everybody, for the most 14 part, is familiar with that. And it rates aspects 15 of vehicles in the five star rating system. Current applications are a crash test, 16 rollover ratings; it's also used for new car 17 18 seating regulation. Consumers are aware of this. They're 19 starting to become familiar with it, and have some 20 21 knowledge of the five star approach. 22 RMA believes developing a five star tire efficiency rating system would benefit consumers 23 24 by providing information consistent with other 25 consumer information.

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I I'm not so sure that we're locked into a star rating system. But I think we're locked in, or at least our proposal is a bin type system, whether we call it stars or whether we call it letter grades, or fuel pmps or whatever. I think we're open to that.

7 Okay, so now we get into the basis of 8 the RMA proposal. Our five star rolling 9 resistance coefficient rating system. This is 10 what we have lined up. And so a lot of questions 11 are going to be answered in the next few slides, 12 so just hold on for a second here.

But our proposals, we have a five star rating system. One star would be anything greater than 12 kilogram/tons. The bin widths are 1.5 kilogram/tons. So a two star would be anything between 10.5 and 12 kilogram/tons.

And going down to the five star, at least -- up to the five star level, which would be the lowest rolling resistance coefficient, would be 7.5 kilogram/tons or lower.

22 Next slide, please. And this is how we 23 come up with all of this. As Mark mentioned when 24 he presented all of his data, this represents, 25 this curve, about 88 percent of the domestic

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1 market. And it's over 1000 datapoints.

2 For all of the tires that were combined, I think 1007 datapoints from the combined 3 4 California database as well as the RMA database. 5 But you see, based upon the 6 distribution, we have a fairly evenly distributed 7 between five star, four, three, two and one. Of 8 course, the middle, three star system, would represent about 46 percent of the current 9 10 distribution. The chart you see on here is a sales-11 weighted rolling resistance coefficient of the 12 13 percent of the current market as we've defined it, 14 which would fall into our proposed rating system. 15 One percent of the current tires would be five

16 star down to about 7 percent of the current tires 17 would be one star.

18 Next, please. So Consumers Choice had a 19 proposed rolling resistance rating system. This is really a rehash of what Mark presented. 20 But 21 for the most part, the database that we collected 22 we feel is a good representation of what exists in the current marketplace. And accounts for about 23 24 88 percent of the domestic replacement tire market. The other bullet points here you've 25

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1 already seen before, so we'll skip to the next
2 slide, please.

3 Digging into this information in a
4 little bit more detail. We took this 1007
5 datapoints and said, okay, from a consumer's
6 standpoint, let's take a look at it and see what
7 would be available based upon speed rating.

8 One of our criteria is you replace a 9 tire with an equal-to or higher load index, make 10 sure the tire carries the load. And also you make 11 sure you have the proper speed rating on the tire.

12 So what we have here is all the combined 13 data. And on the horizontal axis we have whether 14 it's a one, two, three, four or five star system 15 based upon our data.

Also indexed on the vertical system, we have speed rating. And as you can see, the one star through two, three, four star rating systems include all of the available speed indices.

20 However, when you get to five star, the 21 nature of the tires, we don't have any five star 22 rated W, Y or Z rated tires.

Next, please. Now taking a subset of
that data and looking at a specific size, the
195/65R15, we have 102 datasets. A similar type

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scenario. You can see we have a pretty good 1 2 distribution between one and four stars. We have no choices, though, in the five star rating 3 category. But for the most part, if a consumer 4 5 would come in and wanted to buy a 195/65R15, he 6 would have a choice between one and four stars for 7 any speed rating. That's pretty much applicable for that size tire. 8

9 MR. TUVELL: Tim, Ray Tuvell from the 10 Energy Commission. Let me just clarify again how 11 you got here. It appears to me that what you did 12 is you created a five star system based on RRC 13 where you rated all passenger tires against each 14 other, is that correct? Regardless of size. I 15 mean that's the concept.

All passenger tires on the market
regardless of size are rated on the five star
system based on RRC.

MR. ROBINSON: On a previous slide,
 correct.

21 MR. TUVELL: Okay. So, and the net 22 effect of that is, in this case here on this 23 slide, you have no tires that are in the five star 24 system, with five stars for the 195/65-15s. 25 MR. ROBINSON: Within our dataset.

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MR. TUVELL: Correct. Okay, so let's 1 2 say, for the sake of argument, that this, in fact, is all tires that are this size. There are none 3 4 in the five star. 5 MR. ROBINSON: Correct. 6 MR. TUVELL: What message does that say 7 to consumers? 8 MR. ROBINSON: It tells them they have a choice between one and four stars. 9 10 MR. TUVELL: Okay, right. But why -okay, so I'm a consumer. I want the lowest 11 rolling resistance tire. Why don't I have a five 12 star tire in the 195/65-15 that fits my vehicle? 13 14 MR. ROBINSON: Well, that's when it gets 15 down to market conditions and market pressure. You can be assured that once individual tire 16 companies understand that there's a demand out 17 18 there, people start to complain and say, hey, we have an opportunity to sell a 195/65R15 tire if we 19 20 had a five star rating tire, you can be assured 21 they're going to start to develop one. MR. TUVELL: Okay. Now here's where I'm 22 going with that. Doesn't this then become a 23 24 shortcoming of the system where you rate all tires 25 against each other, versus let's say you took all PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

1

2

3

195/65-15s and just rated them against 195/65-15s? MR. ROBINSON: Well, that's what we're doing.

MR. TUVELL: No, no, I mean your system, in the very beginning, I looked at this from a size-specific basis. And I divided those sizes, you know, all 195/65-15s in the market, and I divided them into five categories, so that, in fact, there would be a five star -- there would e a group of five star 195/65-15s.

11 So the consumer then can go out and say, 12 oh, yes, here are the lowest rolling resistance 13 195/65-15s in the marketplace because they're a 14 five star.

MR. ROBINSON: Well, you could do that, but you'd have to slide the scale based upon the representative market.

MR. TUVELL: No, I mean you wouldn't have to do it that way. I'm just saying why not just rate tires based on their size. In other words, take all the same size tire and base the rating efficiency or energy efficiency on the size, itself, for each size.

24 MR. ROBINSON: Well, then you get into 25 the fact you won't have the opportunity to compare

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1 size to size.

MR. TUVELL: Okay, but we agree that 2 that's a small portion of the marketplace. 3 4 MR. ROBINSON: But it's still a -- I 5 don't know if it's small. It's a significant 6 portion of the marketplace. 7 MR. TUVELL: Okay, but so here's what 8 I'm getting to. If that becomes the driving factor, that gee, we have to come up with a 9 methodology by which consumers can compare 10 11 different sized tires, then do you end up living with a system where there is no five star tire in 12 13 certain categories, versus wait, maybe let's not 14 focus so much on the need to compare all size 15 tires against -- or all, you know, for a consumer to compare different sized tires against each 16 other. 17 18 And give them a system where they go out looking for a five star tire and they can find it, 19 in their size. And they'll find it every time. 20 MR. ROBINSON: Mike, do you want to 21 22 comment on this? MR. WISCHHUSEN: This is Mike 23 24 Wischhusen, Michelin. A couple points. Somebody made the comment earlier today, I think there are 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

in excess of 300 active tire sizes. So, you know,
 first you're looking at 300 different rating
 systems.

And now to try to take care of my friend, Gene, try and explain that -- there's a balance. I mean there's a natural balance between complexity and effectiveness.

8 Tire size is a way you can do this. 9 Then you've got 300 plus different rating systems. 10 You could do it on a range of max load capacity, 11 okay. And that begins to address what Tim is 12 talking about where you may be looking at some 13 size flexibility.

You could look at it on the basis of outside diameter of the tire. You could have different classes of outside diameter of the tire. Because the outside diameter of the tire is a very close approximation of load capacity of the tire.

So there are many ways to do it, but
 it's a balance of complexity versus effectiveness,
 ability to convey the information to the consumer.

And I'm with Tim, and actually I'm going to address this point in my presentation later, having an empty bucket at the top of the scale is the best incentive you're going to get

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1 manufacturers to change what's offered in the 2 marketplace.

You know, but, hey, I'll save millions 3 4 of dollars in development costs, and we'll set up 5 the bucket system so that I already populate that top bucket, and I don't have to improve anything. 6 7 MR. ROBINSON: There's no incentive. 8 MR. WISCHHUSEN: Yeah, exactly. MR. TUVELL: I appreciate the points, 9 and you make it sound so black and white. It's, 10 gee, it's that or that, and that's all. When, in 11 fact, there's many variations in between, Mike. 12 13 And I wish that you would open your mind to say, 14 wait, there are different variations, doesn't have 15 to be simply one way or the other. And that's what we're trying to get out 16 here, is the opportunity for people to consider 17 18 and explore and understand that there are various ways of doing this that could possibly achieve all 19 20 of these objectives, including the one. And believe me, I will tell you, that 21 22 one of my key objectives in any system I come up with is something that's going to create 23 24 competition among the manufacturers. 25 It will happen. It will happen. But

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1 there's various ways to get that to happen.

2	MR. ROBINSON: Well, let's proceed here.
3	We have some additional information which may, I
4	think, clarify and add some credence to what the
5	consumer actually could use, which is miles per
6	gallon actual gallons of gas saved.
7	DR. WADDELL: Walt Waddell, I have a
8	question based on your proposed five star rating
9	system. Looks to me like your system is actually
10	even more liberal than the European system because
11	your max RRC at 7.5 encompass two of their bands
12	or classes, is that correct?
13	MR. ROBINSON: Possibly, yeah. Well,
14	the European system bands, some of those are
15	hypothetical, which cannot be filled yet. Those
16	are for future expansion.
17	DR. WADDELL: But we just saw that with
18	the 195 tire.
19	MR. ROBINSON: Right.
20	(Parties speaking simultaneously.)
21	DR. WADDELL: No, no, I understand that.
22	There's no band D
23	MR. TUVELL: Come to the mic if you need
24	to talk.
25	DR. WADDELL: But what happens is I'm
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saying the European system has a 6.5 class A, and 1 then a 6.6 to 7.7 class B. You're throwing all 2 the A and Bs and giving them five stars. You 3 4 could have given the 6.5s the five stars, and then 5 greater than 12, no stars. 6 MR. ROBINSON: Can you scroll back to 7 our -- go to the previous slide, please. The one 8 that shows the Bell-shaped curve. There we go. Okav. 9 10 What's your point, Walter? You're saying we could have slid this down or slid it up? 11 DR. WADDELL: Well, if you're wanting a 12 13 universal type system, Europe's got six 14 categories. I understand one of them --15 MR. ROBINSON: I'm not hearing --DR. WADDELL: -- is not filled. 16 MR. ROBINSON: Are we hearing we want a 17 18 universal type system? 19 DR. WADDELL: No. I'm just questioning 20 what it is we're proposing. We're proposing here 21 to combine Europe A and B into five stars. Yes? 22 MR. ROBINSON: Sorry, we're what? DR. WADDELL: The proposal here is this 23 24 1 percent in the five star --25 MR. ROBINSON: Correct.

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DR. WADDELL: -- is European bands A and 1 2 B combined. MR. ROBINSON: That's possible. I'd 3 4 have to take a look at it, but, yeah, sounds like 5 it. 6 DR. WADDELL: Okay, thank you. MR. ROBINSON: Okay. This one. Great. 7 8 A lot of good dialogue. 9 The next item is again, taking a subset of 1007 datapoints, the 265/70R17, 65 tests in 10 this case. And for the most part a pretty good 11 choice for all those different type tires. 12 13 Now, the one star rated system you don't 14 have some H speed rated tires in there, but, 15 again, this would open it up to competition, could potentially, if there was a demand in the 16 marketplace, fill that category. 17 18 Next slide, please. So the question, how do we provide additional information related 19 to safety and durability so the consumer will 20 21 understand the potential tradeoffs when it comes 22 to a fuel efficiency rating system. We're not just trying to sell a tire 23 24 based upon fuel efficiency. We also have to consider safety. So consumer information: 25

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components, tire efficiency, rolling resistance,
 also safety, which we are going to advocate using
 wet traction from UTQG, and durability tread wear
 from UTOG.

Next slide, please. Can you slide that
over a little bit? Looks like we're truncated
some of it.

(Pause.)

8

MR. ROBINSON: That's okay, we can go 9 10 back -- I think what I need is on there. Okay, this is a trend analysis we did on all the 11 datapoints that we collected, the 1007 datapoints, 12 13 comparing looking at the RMA five star rated 14 system and looking at the number of stars within a 15 given speed category. And also looking at four of those star ratings, the comparable tread wear 16 17 range and the UTQG traction range.

So you can see the trends are, as you go up in speed rating your choices in average fuel efficiency ratings, from a star rating based system, decrease. Also your tread wear ratings typically decrease, as well. But your traction ratings increase.

24 So hypothetically let's just take a look 25 at an H rated tire. I can say, okay, I want a

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five star rated tire for fuel efficiency. But
based upon what we see now in the marketplace that
would require an A traction grade. So you would
not be able to get a AA traction grade five star
rated tire. So this is going to provoke
competition within the marketplace.

Next. So integrating safety and
durability consumer information we'd like to use
traction as a surrogate for safety and tread wear
as a surrogate for durability. And use UTQG in
combination with fuel efficiency information at
point of sale.

13 Next, please. This is an RMA concept. 14 It's one method that could be used. You convey 15 all this information so that the consumer can make 16 an informed choice. Hypothetical tire, but tire 17 fuel efficiency rating, stars, one, two, three, 18 four, five. This could be letter grades, could be 19 fuel pumps, whatever.

20 But it shows the relationship of the 21 fuel efficiency rating system in combination with 22 the UTQG traction grade, in combination with the 23 UTQG tread wear grade. All the information would 24 be available so the consumer could make an 25 informed choice, looking at both safety,

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1 durability and fuel efficiency.

2 Next, please. So, how do we tie all 3 this in to the consumer so that they can 4 understand, okay, I got a four star versus a three 5 star. What's that really mean to me in the 6 marketplace.

7 What we could do, this is an RMA concept 8 on how to communicate potential fuel savings to 9 consumers. You could give them point-of-sale 10 information stating that, and of course this has 11 to be worked out to make sure that it's accurate. 12 We're fairly sure that it looks pretty good, but 13 we need to confirm that.

But going from a one star to a two star system, got a new tire, it's a one star, and a new tire that's a two star. What does that really mean to me for my specific vehicle for estimated annual fuel savings.

Well, if we look at the hybrid going from a one star to a two star, that saves me about six gallons of gasoline per year. This is a way to tie it into the star rating system and to convey to consumers how much fuel savings they'll have per year.

25 Next, please. So will consumer

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information stimulate manufacturer competition and
 innovation. And our answer is yes. The federal
 UTQG program illustrates how the availability of
 consumer information stimulates competition and
 product improvement.

6 Mike will mention in a minute here that 7 UTQG traction grade, we used to have A, B, C. But 8 through the progression of technology and the improvement of tires over time, all the tires 9 10 started to cluster around an A traction grade. 11 So then we expanded that to have a AA. So that's how technology works, and how competition 12 13 forces improvement.

14

Next, please.

MR. TONACHEL: Sorry to interrupt. Luke Tonachel from NRDC. Back in your table you give the example of going from a one star to a -- I guess one to a two star, and the gallons saved. Is it all additive? If I went from a two to a five?

21 MR. ROBINSON: Yes, yes, it's additive. 22 Of course, those details all have to be confirmed 23 to get exact numbers. But this is, in concept 24 they would be additive.

25 Okay, so summary. Rolling resistance PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

1 2 coefficient should be used as a rating system basis as opposed to rolling resistance force.

3 We feel it provides consumers with 4 accurate fuel efficiency information and direction 5 for their vehicle, particularly when it comes to 6 upsizing or changing tire sizes.

7 The ISO 28580 procedure is based upon
8 rolling resistance coefficient for lab alignment;
9 and as Dan mentioned, data quality requirements.

10 The ISO 28580 procedure should be used 11 as a test basis to rate tires for fuel efficiency 12 primarily because it includes provisions for lab 13 alignment -- be reporting numbers that are aligned 14 numbers where you can compare lab A to lab B for 15 the same tire.

16 A five star rating system is recommended 17 with 1.5 kilogram/ton bin widths as supported by 18 the ISO 28580 task group alignment uncertainty 19 values based upon measurement resolution of the 20 best worldwide labs.

Now, this is based upon uncertainty. As
Dan mentioned already, the risk associated as you
approach the bin limits.

24 We also recommend using UTQG and tire 25 fuel efficiency rating together as consumer

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information at point of sale. We can't forget the 1 2 safety aspects of consumer information. And then last but not least, the star 3 4 rating system could be linked to information 5 providing consumers with average expected fuel 6 savings per year. 7 Next slide, please. And that's all I 8 have. So, question? 9 MR. TUVELL: Thank you very much, Tim. Ray Tuvell with the Energy Commission. First off 10 11 I would like to mention one thing. I have a copy of the Bridgestone real questions/real answers, 12 13 tires and truck, fuel economy, a new perspective. 14 I don't know if any of you folks get 15 into the publications or have a chance to take a look at this. Outstanding piece of work. 16 17 At some point down the road when we go 18 out to consumers and try to educate them on the 19 subject of fuel efficiency for passenger tires, I 20 want you and Bridgestone to be a part of the team 21 that helps us do it. 22 MR. ROBINSON: Oh, sure. MR. TUVELL: I mean if -- you could take 23 24 this same stuff that you have done for trucks and help translate it into the subject of passenger 25

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tires. And I know you can, because you've 1 obviously got the knowledge and you know how to 2 3 get the message across. 4 We'd love to be able to work with you on 5 that. This is an outstanding piece of work. 6 MR. ROBINSON: Thank you. 7 MR. TUVELL: Your third point in 8 particular, Tim, we talked about it earlier. I 9 would really love to see the citation of the 1.5 10 kilogram/ton bin width tied to the ISO 28580 task 11 group. If you can show me a task group report 12 13 or something where they say that, and they reach 14 that conclusion, I would love to be able to see it. Because I can't find that kind of stuff. 15 Okay. I can't find it. 16 MR. ROBINSON: Ray, it's not in there. 17 18 The ISO 28580 task group submission was not to recommend bin widths. But what they did provide 19 20 was, to put it in layman's terms, you know, the 21 resolution on our measuring stick, and how 22 accurate that is, such that looking at uncertainty and the risk associated with being close to the 23 24 edges of the bin, what they would recommend. 25 Which would be, I think, 1.39 as a minimum.

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And we've taken the 1.5 as a good round 1 2 number -- and part of it is based upon the EU proposal -- for setting up our bin widths. 3 4 Can you go back, please, to the Bell 5 shaped curve. There's one more point I want to 6 make. And this gets down to this point right 7 here. 8 These bin widths are approximately about 10 percent apart on average, maybe a little bit 9 10 more than that. But a 10 percent change in fuel efficiency is equal to about a 1 to 2 percent --11 I'm sorry, a 10 percent change in rolling 12 13 resistance is equal to about a 1 to 2 percent 14 change in fuel efficiency. 15 So going from a two star to a three star tire, and I get 25 miles per gallon, I get 10 16 percent improvement, my miles per gallon is going 17 18 to go, instead of 25, it's going to go to 25.25. So that's very very difficult for the end user to 19 20 observe. 21 MR. TUVELL: Okay, now --22 MR. ROBINSON: So it doesn't make a lot of sense to make these much tighter. 23 24 MR. TUVELL: No, I understand. But I mean this whole bin system and the justification 25

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for it, and how it's tied back to 28580, I can't 1 2 retrace those steps. Yet I've seen that time and time again in the presentations today. And that's 3 why I'm restating this problem. So, you know, so 4 5 there's no question in anybody's mind about it. 6 But while you're on this chart, in a 7 number of presentations today there have been 8 charts that have been reference to the RMA dataset of 200-plus combinations of tire sizes, and I 9 10 think that's what this is here, too. Until we're able to get our hands on 11 that dataset to independently analyze it, we're 12 13 not in a position to be able to look at something 14 like this and say we agree or not. Okay. 15 So I want to restate this over and over again. The extent to which you're using datasets 16 that we don't have the ability to independently 17 18 analyze, good for you, but how do you expect me to 19 do anything with it. Okay. 20 MR. GUINEY: Dan Guiney, Yokohama. Let 21 me try to do my best to help with the ISO versus 22 the calculation of categorical widths. The best way to describe that is there 23 24 are available statistical methods that have nothing to do with ISO. They are just basic 25

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statistics that any statistician -- I'm not one, I'm a layman, I understand a good bit of it, but they could come and present to you the exact same terminology, just statistically, how all that's derived.

6 The ISO group did use methodologies that 7 are common statistics to resolve categorical 8 widths as a judgment for different alignment 9 methods. It's all statistics that's available to 10 anyone.

11 So, probably what would be appropriate 12 is a future discussion and a future review of the 13 statistical methods to judge the categorical 14 widths. And it really doesn't have any unique 15 applicability to ISO. It was just normal 16 statistical methods that were used to judge 17 alignment methods.

18 MR. TUVELL: Ray Tuvell with the Energy
19 Commission. Dan, I appreciate the offer and I'll
20 take you up on it.

I actually need two things to help me with this subject area. One is more in-depth and inside information on what happened with ISO and that committee, and what they actually concluded. Because there's been a breakdown in

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information getting to us on that. We're getting 1 it now through filtered sources that suggest to us 2 that it is not the direct information that was 3 4 developed then. And it concerns us a lot. 5 And then so I'd love to get a more in-6 depth understanding of what's happening there. 7 Plus some of the subjects that you 8 didn't mention today on, at least in depth, on 28580. Who's going to be running the reference 9 10 lab? When? When are they starting up? When are we going to start seeing some of these tires 11 available for other candidate labs to be 12 13 calibrated against the reference lab? Who's 14 setting up the administrative mechanism for that? So that I will know whether or not this lab has 15 been calibrated against the reference machine. 16 How's that all being handled? Who's 17 18 responsible for making sure that it gets underway and gets handled? 19

I mean I have my list of questions on what's going on with ISO and the test protocol that's endless right now. And we dearly need somebody to step forward who can give us the objective straightforward picture on what's going on there. Because it's of significant importance.

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So, really, it's that aspect of ISO 1 2 28580 that's more important to me than what do you do statistically and how you can do different 3 4 analyses. 5 MR. MEIER: It's Alan Meier. And I had 6 one question about consistency with the European approach. And the last time I heard about the 7 8 European approach they actually had a couple bands at the bottom that were only 1 kilogram/ton wide. 9 10 Is that accurate? MR. ROBINSON: I'm not sure if they were 11 1, they may be 1.25. We have to go back and look 12 at the EU proposal, but most of them in the range 13 14 that we're in are same band widths, 1.5 15 kilogram/ton. I believe they had some that were a 16 little lower, they were 1.25. 17 18 MR. WISCHHUSEN: Yeah, we have to realize the European system is not finalized. 19 20 MR. ROBINSON: Right, --21 MR. WISCHHUSEN: I mean it's a proposal 22 at this point. MR. ROBINSON: -- it's hypothetical. 23 24 MR. MEIER: So, are you going to propose a different, make a change in these to keep them 25

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harmonized with the Europeans?

2 MR. ROBINSON: That's not our proposal right now. No, this is our proposal. 3 4 Okay, any other questions? Okay, thank 5 you. MR. TUVELL: Take a break? For those of 6 7 you on the internet, we're going to take a five-8 minute break. 9 (Brief recess.) 10 MR. TUVELL: Folks on the internet, we're going to reconvene now with the last 11 presentation, Mike Wischhusen of Michelin. 12 MR. WISCHHUSEN: Okay, good afternoon, 13 14 everybody. I'm very happy to tell you I'm the last scheduled speaker today. Okay. 15 I want to talk a little bit about the 16 testing and compliance. And, you know, I brought 17 18 this point up this morning. Always like to periodically go back and remember why we're here, 19 20 you know. We're here to talk about AB-844. 21 And you know, what AB-844 requires is, 22 you know, to select a test methodology; and then based on that methodology, develop a rating 23 system. And then provide or facilitate the 24 25 reporting of data on tire performance, okay.

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1 That's why we're here.

2 Now, next slide. At the last meeting, Smithers, I believe it was Smithers, presented 3 4 some information on the total number of SKUs in 5 the marketplace. It's close. That's a pretty 6 good number. I mean when we look at what each of 7 us have in our own portfolios, their totals are pretty good. 8 9 Remember SKU is stock keeping unit. I mean that's not a term, you know, unique to the 10 tire industry, but basically that's, I want a 11 195/65-98H MXV4. Okay. That's a SKU. That's 12 13 what you go and buy. It's the part number. 14 Now we got to remember any count of SKUs 15 in the marketplace is simply a snapshot in time, because that number changes constantly. We're 16 17 always adding SKUs to the market; we're always 18 removing SKUs from the market. Now, hopefully, in a well balanced 19 system, you're removing just about as many as you 20 21 are adding at any given time. 22 For us, at this point in time, about 10 percent of the SKU count is renewed every year. 23 24 Just, you know, rough figures. Now, don't make the extrapolation that that says an average SKU 25

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life is ten years. That's not quite true, because
 not all tires, not all classes and sizes of tires
 are renewed at the same rate.

4 The ultra high performance stuff tends 5 to be renewed on a much shorter cycle. Snow tires 6 tend to be renewed on a much shorter cycle. Some 7 of the mass market broad line tires have a long 8 luxurious life. So it's a bit of a stretch to say average SKU life is ten years. But, on average, 9 10 percent of the total SKU count gets replaced 10 11 every year. Okay, so that's a pretty good number.

12 Now, let's go to the next slide. Just, 13 you know, philosophically, the testing that we do 14 as manufacturers historically has been centered 15 around endurance traction and tread wear. Okay, 16 those are the ones we do the largest quantity of 17 testing on.

And interestingly, you know, those are the three things that always show up at the top of the market surveys, you know, what are consumers after when they're looking for tires.

Now, if we start doing a lot more rolling resistance testing it's going to require some significant investment on the part of the industry. I mean that's, I don't think, a

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1 surprise to anybody.

2 The industry understands that. We accept it. We're happy to do it, but we just want 3 4 to try to do it in the most economical and most 5 beneficial way. 6 Okay, next slide. The question of 7 current tire capacity came up, and I will tell 8 you, that is a thorny question. That is not an easy question to answer. It's not as simple as 9 10 counting excess machines. I mean I think you can go through any one of our facilities, you won't 11 find excess machines. I mean we don't buy test 12 equipment and let it sit idle. I mean that's a 13 14 very poor investment on our part. 15 You've also got to realize the machines that are used for rolling resistance testing can 16 be used for other things. So, if we're not 17 18 running a rolling resistance test on Tuesday afternoon, that doesn't mean that machine is idle. 19 20 It may be doing another test. Okay. 21 You've also got to realize it's not only

test machine capacity, it's the availability of operators to run those tests. Okay. So you can have the machine, but you don't have an operator, and you can't run any more tests. So you've got

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to look at both of those things.

2 So, now each company, there's no standard model for how we equip, account for and 3 4 staff our testing facilities. Everyone of us does 5 it differently. So to try to throw us all into one model is a little bit difficult. 6 7 So, the concept of excess capacity can 8 be challenging. And trust me, it's very challenging. 9 10 If we go to the next slide, we tried looking at it a different way, okay. We kind of 11 reversed the question. Rather than saying how 12 13 much capacity do you have, and how fast could you 14 test all these tires, we turned it around and 15 said, if we had a time target to do all this testing what would we have to do to our capacity 16 to meet that time, okay. 17 Now, if you look at current, you know, 18 today capacity in terms of machines, and labor to 19 20 run them, and in the hypothetical situation that 21 we had to test multiple replicates of every SKU we 22 make, which was in the vicinity of 24,000 there, it's going to take decades to do that. You know, 23 24 given the current capacity. 25 And that goes back to my slide a minute

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ago, if we're going to do that much testing we
 have to make some investment, okay.

So, you know, we did an exercise to look 3 4 at that investment. Go to the next machine. 5 Let's look at the assumptions on the right first, 6 okay. We assume we're going to test every SKU, 7 three replicates of every SKU. We are not 8 counting the additional ongoing compliance testing or quality control testing that we would have to 9 10 do on top of it. We're only looking at the initial count of tests. 11

12 Three-year implementation period, again. 13 I mean that's a number that's picked out of the 14 air, but in the regulatory world, the three-year 15 implementation timeline is not uncommon.

So, now we say, okay, the existing 16 machines we have, add the necessary labor to take 17 18 those machines to 100 percent utilization, all right. And then add additional machines and 19 additional staffing to finish the rest of the job. 20 21 Again, you know, Smithers reporting, 22 they're looking at the machine availability question. Said it's probably about 18 months, you 23 24 know, to order a machine, get it installed and

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start using it. Again, that's probably a good

1 estimate.

2 So, what that says, though, is if we 3 start today and order machines today, I'm not 4 testing until 18 months from today. So that cuts 5 in half my three-year implementation time. So I 6 now have actually 18 months to do this testing, 7 not 36 months to do this testing.

8 And you've got all the other costs. I'm 9 not sure in the previous estimates, you know, they 10 thought of things like HVAC costs, electricity 11 costs and all that stuff. But there are operating 12 costs for these machines. I mean they're all 13 electrically driven.

And the other thing, we're not going to design and build a tire in South Carolina and test it -- and send it to France to be tested, okay. Other companies are not going to design and build a tire in Tennessee and send it to Japan to be tested, okay.

The testing capacity exists and the testing capacity that's available is the testing capacity that is where you operate, okay. So the global testing capacity is really not valid. You've got to look at the usable, accessible test capacity.

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Okay, so if we do that, with all those 1 assumptions, we're going to buy a certain number 2 of machines to the tune of about \$7.5 million, 3 4 okay. And that's almost 6 million of test 5 machine, itself. But then you can't just put this 6 test machine on a bare floor you know, outside the 7 front door of the test building. I mean it's got 8 to be in a proper environment. So there are some test cell costs that go along with it. 9 10 Don't forget, if we're going to be testing three times 24,000 tires, that's 75,000 11 tires. Those tires cost money. And after you 12 13 test them you can't sell them, you have to dispose 14 of them. They're a disposal cost. I mean so there are tire costs to this idea of testing. 15 All those costs, those aren't annual 16 17 costs, they're capital investments, a one-time cost. But, you know, look at things like waiver. 18 19 This is the additional people. And we're going to a 24/7 shift cycle, you know. How many people 20 21 would we have to hire to run these machines 24/7. 22 You've got energy costs; you've got maintenance costs. I mean these are complex 23 24 machines, they break, the need preventative maintenance, okay. So there's a cost associated 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

1 with that.

2	Total that all up, you're looking north
3	of \$21 million to do that. And, again, heavily
4	driven by that three-year assumption.
5	Okay, let's go to the next slide. Now,
6	that brings us the question, all that analysis was
7	done on the presumption that we've got three
8	triplicates of every tire. Okay.
9	Is there another way to do this? Yeah,
10	we think there is. And that would be to develop
11	an efficiency rating system comprised of self-
12	certification plus some sort of an audit system.
13	You know, if we do it like the federal government
14	does it, it's self-certification with an audit.
15	We know they're auditing us, okay. That's kind of
16	an incentive not to cheat.
17	You can also do it, rather than a
18	government audit, you can do a stakeholder
19	challenge, okay. I don't believe Dan, you know, I
20	want you guys to check Dan, so actually I will
21	check Dan's tire, okay.
22	But there are ways to do this, okay. So
23	don't think that self-certification is carte
24	blanche for manufacturers to cheat. I mean say
25	certification works. I mean NHTSA uses and trusts

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self-certification with the federal motor vehicle
 safety standards, okay. These are the safety
 standards that govern the safety of motor vehicles
 and tires. That's the self-certification system.

5 Okay, let's go to the next slide. The 6 first option we had, which was do all the testing 7 and submit all the data. It would require tire 8 manufacturers to submit test data on every tire 9 sold in California. I mean that's what AB-844 10 says.

Now, be realistic. Okay. We don't make unique tires for the state of California, okay. So what that requirement's going to do, we're going to have to test every tire we build, you know, regardless of where it's sold in the United States. I mean that's reality.

I mentioned it before, we're not only talking about the initial testing, but we've also, depending upon the quality system that each one of us uses, and each one of us uses a different quality system, but we're going to have to do periodic rechecks.

Okay, so in addition to that 75,000 test slug you've got to digest, annually, you're going to be doing more testing, which is the 10 percent

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of the new SKUs that come into the market, and however many additional tests you're doing, you know, just to verify that you're still where you think you are.

5 Okay. All right. Now, in our 6 estimation that data submission option, you know, 7 this idea of massive amounts of testing is 8 probably the highest cost and the longest 9 implementation time of the possible solutions.

10 You know, you've got capital investments 11 on the manufacturers part, and the operating expenses. Whatever organization is receiving this 12 13 data has got to invest in the expertise so they 14 understand what the data is, and they know what 15 they want to do with it, and they do whatever it is they want to do with it. So there's a cost; 16 there's a cost there to the presumed regulatory 17 18 agency.

19 It's come up a couple of times, there's 20 a larger investment both for the regulator and for 21 the manufacturer, I believe it was Dan's point; 22 and for Consumers Union on consumer education. I 23 mean this stuff is not intuitively obvious, okay. 24 I mean if there's one conclusion we can draw from 25 however many years we've been working on this,

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this stuff's not intuitively obvious, okay.

And we can't expect consumers to immediately grasp concepts like rolling resistance force, rolling resistance coefficient and things like that. So there's going to have to be a lot of education that goes along with it, and that's not free.

8 All right, next slide. All right, now 9 let's look at the other way, the concept of self-10 certification. As I said, that is the bible for 11 U.S. federal laws, U.S. federal regulation, self-12 certification. I mean we know it in the motor 13 vehicle industry, I mean that's the way it goes.

14 The burden is solely on the manufacturer 15 to insure compliance with federal safety and 16 consumer information regulations, okay. It's used 17 for UTQG, it's used for the federal motor vehicle 18 safety standards.

19 It does not specify the means to comply, 20 okay. It doesn't say you must do this to assure 21 yourself that you comply. It simply says you must 22 assure yourself that it complies. And when we 23 audit you it had better comply. And if we audit 24 you, here's what we will do. Okay, so that test 25 procedure for the audit process is known to us,

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1 okay.

So we have the ability to say whatever 2 method we choose is validated by the audit test 3 4 procedure. Okay. 5 Next slide. Now, again, it's not only 6 we have to prove to ourself once that it passes 7 the test, we have to continue to assure ourselves 8 that things haven't changed, something hasn't happened that means it isn't going to pass again. 9 10 So, again, whatever quality system we have in place -- and that's our choosing; I mean that's 11 not specified by the regulation -- we're going to 12 13 do more testing based on that. 14 Okay, next slide. All right, now why does self-certification work. There are 15 significant penalties for noncompliance, all 16 right. I mean if we screw up we know there's 17 18 fines for not complying, okay. If we get caught not complying we pay a hefty fine. Okay, that's a 19 20 big deterrent.

Also, the consequences of noncompliance, you know, in addition to the cost, that's a damage to our company's reputation, okay. And in the business world when we're selling products to consumers our reputation is the most important

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1 thing. Flat out, okay.

2	If your consumers, if the purchasers of
3	your product don't trust you, they will not buy
4	your product, okay. We guard that very zealously.
5	And there's the periodic government
6	auditing. I mean that's the way we work with
7	NHTSA. They periodically audit. Doesn't have to
8	be a government audit, it could be some sort of
9	stakeholder challenge system. It's going to work
10	the same way.
11	Okay, next slide. Now, what are the
12	benefits of a self-certification system? It
13	minimizes the government bureaucracy that you need
14	to put in place to manage a system. It doesn't
15	eliminate it. It reduces it. Maybe minimize is
16	too strong, it reduces the bureaucracy that's
17	needed to ride herd on another type of system.
18	It give us, the companies, the
19	flexibility to design a compliance program to meet
20	those needs. And I'll tell you, flexibility
21	equals reduced costs, okay.
22	When a procedure is dictated it's
23	expensive. If the guidelines are dictated, if you
24	have the flexibility each one of us is going to
25	choose a slightly different path, which reduces
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our costs the most. But still gets the end
 result.

And we'll use a variety, you know, a combination of methods to insure compliance, testing, I mean testing is the most straightforward. You throw it on the machine and you see what it does.

8 We've got some pretty sophisticated 9 computer models, okay. And we can predict very 10 very closely a number of performances of a tire, 11 okay.

12 Now, testing and computer modeling are 13 not mutually exclusive. Based on what you see in 14 the testing you develop the theory that lets you 15 develop the model. Then you run the model and you 16 go back and you check the model. You validate the 17 model with testing. So it's a combination there.

But long term, once that model is developed, you can significantly reduce the number of tests, all right. And there, again, that's the benefit to the manufacturers of not overspecifying, okay. So it's, you know, selfcertification if a good point there.

You know, quality control in themanufacturing process, some companies will pick

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random tires off the line and test them. You
 know, some companies will use predictive modeling.
 Some companies will use architectural measurement
 controls. There's many different ways to assure
 that compliance.

6 And, again, we do things we're not going 7 to tell you about. I don't want these guys, you 8 know, to hear what we do. I mean and there is, 9 accept it, guys, there's a lot of trade secret in 10 this business. Okay. A lot of proprietary 11 information.

12 So every once in awhile you're going to 13 ask something and we're going to smile and say, I 14 can't answer you.

Okay. Next slide. Now, let's look, you know, Jim made a proposal for a self-certification based energy efficiency rating system, okay. So now let's go take self-certification, which the last couple slides been talking about. Now let's take self-certification together with a proposal for an efficiency rating system.

Again, from our perspective, the most cost effective means to assure compliance, and that's cost effective for the industry, and it's cost effective for whoever is going to be

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monitoring the compliance with the regulation.

Self-certification is not without cost. 2 It's not free, okay. But it's a lower cost than 3 4 this mandated you must test everything. 5 Most importantly, it accelerates the 6 environmental benefits by compressing the 7 implementation time, okay. If we've got to 8 purchase, install and test every SKU, you know, we're, like I said, I mean we're out here three 9 10 years from now, okay. If we can do this based on a self-11 certification system, you're going to cut that 12 13 implementation time, you know, I can't give you an 14 exact number, but you're going to cut it by 30 15 percent, you're going to cut it by 50 percent. You're going to get faster; you're going to be 16 able to implement faster. Consumers are going to 17 18 benefit faster. And society benefits faster. And remember, that's what we're here 19 20 for, is the consumer benefit and the societal 21 benefit. And this is going to get us there 22 faster. Okay, next slide. Pretty much what I've 23 24 said, you know. If we're not required to test every SKU we'll do a lot of statistical modeling 25

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1 and sampling techniques, which reduces the cost 2 requirements.

The test demand is reduced to a level 3 4 manageable probably with awfully close to our 5 existing machine capacity, okay. Not our labor 6 capacity, but our existing machine capacity. So 7 the industry can dramatically reduce that \$21 8 million figure. And what was it, 7 or 8 million 9 of that was equipment cost. We could 10 significantly reduce that if we can manage and 11 reduce the amount of mandatory testing.

12 And we can get to the point of assigning 13 grades to tires without suffering this lead time, 14 the delay of the lead time, to do all the testing, 15 all right.

16 Next slide. We tried to put some 17 numbers on this, okay. I mean this is not 18 precise, okay, but we're looking.

19Again, let's look at the assumptions.20RMA can only talk of RMA members. Okay, there's21eight RMA member companies. The nonRMA member22companies haven't participated in this, so we23can't say anything about them.

Even self-certification still encountersthe costs associated with testing and rating

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tires. There's some testing that's going to be 1 2 done, all right. The rating system addresses existing SKUs, okay. We don't necessarily have to 3 4 go back and test every one. 5 Again, assuming probably within 24 6 months we can do the necessary testing that we 7 have to do, all right. Again, it's an assumption,

8 it's an assumption.

9 We think we'll end up testing about 20 percent of the SKUs, okay. Because when tire 10 lines are developed, you may have 20 different 11 sizes in a tire line. If you test every fourth or 12 13 every fifth one through the size range, you can 14 extrapolate what the ones in the middle will be. 15 And that's the significant reduction in test capacity, is operating on that sort of statistical 16 17 methodology.

18 We think we can do this with no new equipment purchase, or at least a minimal 19 20 equipment purchase. All right. And there are a 21 couple companies, I mean, that are within RMA that 22 do not have the existing test capacity to do this. They're going to have to make a choice. They're 23 24 either going to invest in that machine capacity or they're going to go to a third-party source for 25

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1 the testing. All right. But, again, that's their 2 choice.

All right, next slide. If you just, you 3 4 know, kind of summarize the benefits of the self-5 certified energy efficiency rating system, now we 6 were looking at in excess of \$20 million for the 7 full fledged test everything. Compared to about 8 1.5, a little over 1.5 million for the selfcertification based system. 9 10 If we have to test everything we're

11 looking at three years to collect the data before
12 you start developing the rating system.

We said here 24 months. I mean if we can do the self-certification bucket type system that Tim talked about, we'd probably have it rolling in about 24 months. Again, I mean, that's not a commitment. It's an honest estimate of where we think we can go.

Look, I mean face it, the complexity, the questions we have faced today and in every one of these workshops we've had, this is complex stuff, okay. Somebody has got to understand it. And I think for the regulatory agency that's going to be managing this thing, it's going to be incumbent upon them to have that expertise. And I

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suspect there's a cost involved with acquiring or
 developing that expertise.

3 If we don't have that massive data to 4 manage, I think you can get away without the 5 expertise. Or at least a lower cost expertise. 6 All right.

7 Okay, next slide. Now, this is the one 8 we talked about. You know, I think self-9 certification gets a bad rap partly because it 10 gets associated with UTQG, and UTQG gets a bad 11 rap. Some of it deserved, some of it not 12 deserved.

But let's specifically look at a case of UTQG traction. When the UTQG traction system was created 30 years ago, roughly, the boundary levels of the different letter grades, A, B, C, were decided to evenly distribute the then-current population of tires amongst those three grades.

Fast forward 20 years, all of a sudden everything was crowded up in the As. Very very few Cs, only a couple more Bs, everything was in the A. You had this mass population and you knew they weren't all equal, but they were all rated A because that's what the boundary was.

25 So, NHTSA actually took the step of PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

creating a higher bucket. And if you look today you've got a huge population in the AA, good population in the A, and Bs and Cs are dropping in population.

5 So, I mean, that sort of a bucket 6 system, I'll call it a bucket system -- that sort 7 of a bucket system does work at affecting consumer 8 behavior and affecting manufacturer -- call it 9 manufacturer priorities or development priorities. 10 Okay.

11 You look at that UTQG traction case and 12 that's what it tell us. Now, when I asked Gene a 13 question, the rap, I think the valid rap for some 14 of the UTQG tests is that the regulation requires 15 the tire must perform at least at the indicated 16 level.

What that does is allow the manufacturer to effectively derate a product for whatever reason. But that's a very simple solution. Don't make it a minimum rate. Simply, the tire must be marked with the grade that it achieves. Plain and simple.

It's not a fault of a self-certification system. It's a fault in how the regulation is written, and there's a very simple solution to

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that. So we can avoid repeating that error.

2 Okay. And again, the conclusion, you know, manufacturers change their product offering 3 4 and consumers change their purchase behavior. 5 That's what we're trying to do. 6 All right, next slide. So, in summary, 7 you know, the RMA, Tim said it, I'll say it, we 8 support a self-certified tire energy efficiency rating system, okay. 9 10 We're going to get to where we want to be faster. And we're going to reduce the industry 11 costs; and trust me, you know, you know how the 12 13 auto companies are faring in the economic 14 situation today. All right, we're not a whole lot 15 different than the auto companies. And this is -- in Goodyear this is a 16 low-margin business. Scraping up \$21 million of 17 18 investment is not going to be easy. And, you know, I've labeled the industry 19 20 capital expense, again, I think there is a reduced 21 expense on the management side of a program like 22 that, too. Now we just talked about the concerns 23 24 about the derating of UTQG grades is not a fault 25 of self-certification. Regulations can be written PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

to prevent the possibility.

I think that's the last slide. No, wait 2 a minute, I'm sorry. Yes, it is. It's the last 3 4 slide. 5 All right, questions? 6 MR. TONACHEL: Mike, this is Luke 7 Tonachel from NRDC. I just wondered if you could 8 comment on what data you would expect to report under your self-certification program. 9 10 And I guess where I'm going with this is that you indicated the use of modeling tools for 11 some of your SKUs. It seems like even with the 12 modeling tools you'll come up with a value that 13 14 you'll stand behind in case you get audited as to what that value of rolling resistance is for that 15 particular SKU. 16 Any reason why you couldn't provide that 17 18 value? MR. WISCHHUSEN: I --19 20 MS. NORBERG: I think he's asking the 21 datapoint versus the bucket reporting, if you're 22 modeling to a datapoint, I think, is the question. MR. WISCHHUSEN: Our --23 24 MR. TONACHEL: Do you want me to repeat 25 it?

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MR. WISCHHUSEN: Yeah, could you repeat 1 2 it, please. MR. TONACHEL: Yeah, sorry. The 3 question is you had indicated under your self-4 5 certification -- now I'm getting feedback. 6 MS. NORBERG: Oh, sorry -- it's just 7 hard to hear you here, so I was trying to make it 8 more --9 MR. TONACHEL: Oh, --MS. NORBERG: Sorry about that. 10 MR. TONACHEL: I'll try to speak up a 11 little bit. You had indicated under a self-12 certification program the -- you could utilize 13 14 some modeling techniques you could use to get to 15 some SKUs, maybe SKUs that are in the middle of a whole range of SKUs. 16 17 And I was wondering about what you 18 thought of as your data reporting capabilities 19 under a self-certification program. And could you 20 provide sort of those modeling results for those 21 SKUs with the idea that, you know, you're open to 22 auditing and so you'd have to stand by some value for any individual SKU. 23 MR. WISCHHUSEN: Yeah, yeah, you could 24 supply that number. Dan Guiney is going to offer 25

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1 an answer here, too.

2	MR. GUINEY: Yeah. If you go back to
3	the presentation this morning, we would stand
4	behind the category with which that tire is
5	assigned to.
6	We would not necessarily be sharing any
7	data, nor would we be expected to be audited
8	against a numeric value. We would be standing
9	behind it is in that category that was approved
10	per the regulation issued.
11	MR. WISCHHUSEN: Right. And, again, I
12	mean that goes back to the uncertainties that are
13	introduced by the multi-lab situation.
14	You know, if it were my lab alone, yes,
15	we could do that. But for me to submit model
16	numbers and Dan to submit model numbers, you're
17	going to end up with the same concern about
18	uncertainty with multiple sources.
19	MR. TONACHEL: Well, I guess that's the
20	reason why we were delving into this whole
21	uncertainty question this morning, was to
22	understand that value a little better. It's not
23	my sense that coming out of today that we really
24	actually have a clear answer on that.
25	MR. GUINEY: Yeah. And you could, if

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you ended up the regulation required a value, we
 would be forced to say it's this plus or minus
 something. Which ends up being, you know, a
 number.

5 MR. TONACHEL: Well, there's still value 6 in that. You know, one of the things is that 7 you're going to have people outside of the tire 8 industry looking at the whole set of data and getting a sense of what's happening in the 9 marketplace that there could be, you know, some 10 analysis of what's being sold and what kind of 11 benefits come from that. 12

And also, you know, -- you also have the issue of products lining up on the, you know, sort of in the -- function of the bin on the different, where the thresholds occur.

17 I mean that's been seen with many 18 regulatory programs that operate in that way. 19 MR. WISCHHUSEN: Was there a question in 20 there?

21 MR. TONACHEL: Well, I was responding 22 just to the point of whether or not there's value 23 to providing a number.

24 MR. WISCHHUSEN: Okay, but, you know,
25 the uncertainty still exists around that number.

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I mean it's the same uncertainty that exists about 1 2 a number at the border of a bin. I mean any number, it still has that uncertainty associated 3 4 with it. And that uncertainty comes in the 5 largest part due to the fact that you're trying to 6 accommodate a system with basically an open-ended 7 number of data sources.

8 MR. TONACHEL: Yeah, I recognize that there is some level of uncertainty. I'm not clear 9 10 on what that level is.

MR. WISCHHUSEN: All right. 11 I think earlier there had been a proposal, and I think an 12 13 acceptance of the proposal that to perhaps convene 14 another discussion specifically to talk about that 15 subject.

16

MR. TONACHEL: Okay. MS. NORBERG: Mike, with your indulgence 17 and my apologies, I just want to -- on that self-18 certification slide I just wanted to correct the 19 20 cost number that is listed for the self-21 certification option. And this is my mea culpa 22 for -- in the room. I put the wrong number on the spreadsheet. But if you were to look back at the 23 24 self-certification where we have the 1.6 or something like that --25

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MR. WISCHHUSEN: The comparison? 1 2 MS. NORBERG: Yeah, it's -- there you 3 go. Yeah, about two slides on that one, and the 4 one before that you just saw. The number should 5 be 3.9 million. And I apologize. It just -- it 6 was my fault pulling the wrong number off of the 7 spreadsheet. So I just wanted to correct that for 8 the record, and for the materials that are posted on the web, perhaps we can correct that so that we 9 get the right information available. 10 11 MR. WISCHHUSEN: All right. MR. TUVELL: Ray Tuvell with the Energy 12 13 Commission. If it's okay with you, Mike, I'd like 14 to go back and just address it slide-by-slide. I 15 prefer to do that. I didn't want to interrupt you as you went. So, if you can go back -- okay, so 16 from there go forward, please. Right there. 17 18 The machines are not standing idle; the machines are used for testing. Each company 19 equips its staff, the excess capacity issue. And 20 21 then the next slide. 22 Given current equipment, staffing levels 23 and time, and you also made the issue of the 24 problem that you thought that we were grossly in error in not associating location of machines and 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

1 tires and companies.

MR. WISCHHUSEN: Yeah, I think I said 2 it's more correct to assume that the local testing 3 4 capacity is what we have access to. 5 MR. TUVELL: Right. MR. WISCHHUSEN: And I don't think I 6 7 used the word --8 MR. TUVELL: And, and so my needs are very simple. And it's been outstanding for over a 9 10 year and a half now. Give me the name of the company, the location of the test machines and the 11 number of the test machines so I can better 12 13 appreciate this issue. 14 MR. WISCHHUSEN: I know for us we can't 15 do that, because, you know, there are not rolling resistance machines and nonrolling resistance 16 machines. It's --17 MR. TUVELL: That's fine. We'll all 18 apply it the way you want so we can understand it. 19 20 But part of the dilemma, you know, and part of 21 what we tried to achieve in the Smithers analysis 22 that we had done is we broke it down by company to understand this issue. 23 24 And the dilemma I'm having throughout your presentation is you lumped the industry 25

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together. We don't see this as one company; we see it as multiple companies, each with their unique issues. Each with a number of testing facilities -- a number of different locations, and each with its separate needs associated with how many SKUs.

7 And so what we need from you in order to 8 appreciate some of these arguments that you're 9 bringing to us, give us the breakdown by company, 10 how many test machines, where are they located.

11 With that level of understanding we can 12 start to better analyze and appreciate some of 13 your points.

14 MR. WISCHHUSEN: Okay, understand your15 question.

MR. TUVELL: Next slide, please. 16 Same issue here is that this isn't helpful to me to 17 18 understand this problem as the industry as a 19 whole. If Michelin has a specific issue where 20 Michelin has no machines and a zillion SKUs, and 21 we decide that we want to pursue in testing, then 22 we need to sit down with you to understand your issue versus Cooper's issue versus Goodyear's 23 24 issue.

25 If it turns out that there's a need to PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

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come up with a testing schedule and data submittal, if this is the direction we go, then it'll be unique to each company and their circumstance.

5 And so give us the breakdown by company. 6 This is not, from our perspective in order to 7 understand it and advance on this issue, we need 8 to understand it company by company.

9 So, gross numbers like this, I mean, 10 nice; take these numbers, break them down company 11 by company so I can see what we're talking about 12 here.

MR. WISCHHUSEN: What will you do about the nonRMA member companies? Because only RMA member companies, I think, are represented.

MR. TUVELL: Well, I know. Where can I get them here, right, you know. I mean I sent out, before our first workshop, over 150 letters to what I understood to be tire manufacturers throughout the world who supplied to the United States. And I gave them our website and I gave them our information.

Now, are they monitoring? I don't know.
Okay. But we're satisfying our legal requirements
on notification. Okay.

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MR. WISCHHUSEN: All right.

MR. TUVELL: Next slide. It's extremely 2 important for us that you delineate in detail this 3 4 definition of what certification is, self-5 certification is. This was the first time I've heard some 6 7 shot at that when Dan came up and said self-8 certification, to us, is we will give you a category. We will not give you a number. 9 10 And if that's what it is, then we need 11 to understand it clearly, okay. MR. WISCHHUSEN: Okay, you're confusing 12 13 self-certification with a proposal for a rating 14 system. Self-certification is very simply manufacturer responsibility for the assurance. 15 16 MR. TUVELL: Oh, okay. MR. WISCHHUSEN: That's self-17 18 certification. You're talking about a proposal, 19 or our proposal for a rating system. 20 MR. TUVELL: Well, actually, I thought 21 they were both -- I understood the way you described it as one and the same. 22 MR. WISCHHUSEN: No, they're two 23 24 separate concepts. Two separate concepts. 25 MR. TUVELL: Okay. Well, then let me

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say it that way, then. In the case of this rating
 system then you said it is we will supply you only
 with a letter, definitely not a number.

I wish I would have seen that in
something in writing with all the other details
associated with that so we understand what that
means.

8 And you can see the confusion I'm having. The way the term self-certification 9 10 continues to be used in this whole discussion is incredibly confusing to us. We have never --11 we've seen it associated with, oh, it's the way 12 13 the feds do things. Oh, no, it's part of the rating system. No, it's both together. See, it 14 15 goes hand-in-hand.

We need it clearly spelled out so we can understand it, and so everybody can understand it. This matter, and bear with me here, I use the term self-certification, you use the term rating system.

21 We spent quite a bit of time this 22 morning talking about the variability of machine-23 to-machine testing as being a huge issue, okay, 24 despite the fact that the 28580 committee drilled 25 in on that to try to do their best to come up with

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a methodology to nail it, okay.

2 Why? Because it's apparently, and I can appreciate it, it's a significant issue among the 3 4 tire manufacturers. I mean you would like to know 5 that any data coming from any source can be 6 comparable. And I appreciate that issue. 7 Here's my dilemma. Under this self-8 certification process that I understand, go through a couple slides here to your benefits --9 10 you call it benefits of self-certification. Right there, stop there. 11 Let's look at bullet two down there, the 12 13 computer modeling. Can Michelin's computer model 14 predict the rolling resistance of Cooper's Tires? MR. WISCHHUSEN: Relative to our test 15 lab numbers we would get, we could try. But the 16 problem is we're not going to have access to their 17 18 proprietary materials --MR. TUVELL: Okay. So how would I know, 19 20 then, that your data's comparable? 21 MR. WISCHHUSEN: It's because Cooper 22 would do their model development against the testing that they do in their labs. And their 23 24 modeling would match their testing. 25 My modeling would match my testing, and

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we're right back to the lab -- issue, which is 1 what I said in my presentation. 2 MR. TUVELL: Well, but you see where I'm 3 4 going here is that --5 MR. WISCHHUSEN: No, I don't. 6 MR. TUVELL: Well, in the ISO 28580 7 testing they identified the lab-to-lab issue and 8 they came up with a methodology to resolve it. 9 MR. WISCHHUSEN: To minimize it. You 10 can't resolve it. MR. TUVELL: To minimize it. Right, and 11 we're trying to find out exactly what level of 12 13 accuracy they were able to achieve, or their goal 14 is for achieving. 15 And you mentioned a great deal of concern about that. Yet, in your computer 16 modeling approach you say, well, will this model 17 18 submit to it. There has been no testing of Michelin's model against Goodyear's model, or 19 20 Michelin's model against Continental's model. MR. WISCHHUSEN: Because Michelin's 21 22 model would match Michelin's testing. Goodyear's model would match Goodyear's testing. And there 23 has been alignment between Michelin's testing and 24 25 Goodyear's testing.

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MR. TUVELL: Okay, but none of this is 1 2 in the public domain, is it? MR. WISCHHUSEN: No, because the ISO 3 4 project is --5 MR. TUVELL: No, no, no, the 6 modeling capability. 7 MR. WISCHHUSEN: Oh, no, we're not going 8 to share proprietary models, no way. 9 MR. TUVELL: Okay, but that's the important point here to us, and I want you to 10 11 understand that, okay. You're representing to us that we should 12 13 be willing to accept the results of a model that 14 we've absolutely never seen work, that is totally 15 proprietary, never been -- not in the public domain, never been subject to a professional paper 16 tested against 28580 that we could review. Never 17 been tested against other manufacturers. 18 Do you see the position you're putting 19 20 us in? DR. HAWLEY: I think --21 22 MR. WISCHHUSEN: I guess, no, I don't. I mean I don't understand. 23 MR. TUVELL: We have no basis for 24 understanding whether or not your results can be 25

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compared with your results, or your results, or your results.

3 MR. WISCHHUSEN: Anyone else care to -4 DR. HAWLEY: I think Mike's position is
5 that -- I'm sorry, Mark Hawley with ENVIRON.

6 I think what Mike is saying is that if 7 you use modeling to fill the gaps in your testing 8 program, so for instance, you have the same tire manufactured in ten different sizes, and you test 9 10 the smallest, the one in the middle and the largest, you don't need to test every intervening 11 tire. You can develop a computer model that 12 13 allows you to predict the RRC of those intervening 14 tires.

15 And then you're interpolating, you're 16 not extrapolating. And you have a direct 17 comparison in ISO 28580 of the test values at each 18 end and the middle of that range.

19 MR. TUVELL: Yes.

20 DR. HAWLEY: So that Cooper tests theirs 21 and models the ones that they don't test. 22 Michelin tests their and models the ones that they 23 don't test. And they have a good idea of how 24 accurately your computer model is estimating the 25 untested tires in each of their own range.

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1 Then in order to understand how much 2 difference there may be between the modeled values 3 between Cooper and Michelin, you look at the 4 interlab alignment. Those things have been lined 5 up, the tested values have been lined up. And 6 you're only interpolating between aligned values 7 at this stage.

8 So the alignment reduces the variability 9 between the computer modeling results, as well as 10 between the test results.

MR. TUVELL: Well, maybe it did -- maybe 11 it did for Michelin, but it didn't for me. See, 12 13 if you're asking me to accept this information, 14 and, you know, we spent quite a bit of time talking about 28580, and there's documents 15 associated with the quality of the data coming out 16 of 28580, and it's transparent, and it's public, 17 18 and anybody who wants to get it can take a look at it and understand it. Then we start getting a 19 20 level of comfort about what can come out of that. 21 I don't have access to these proprietary 22 models. I don't have any ability to get a level of comfort associated with it. 23 24 MS. HOLMES: Caryn Holmes; I'm with the legal office at the Commission. If I understand 25

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what you're suggesting it's that you would be 1 2 testing some -- there would be the ISO tests conducted on some subset of sizes within a given 3 4 model. 5 And then there would be a computer 6 program that's used to extrapolate -- or 7 interpolate the results for the other tires that 8 are not tested pursuant to the ISO --9 MR. WISCHHUSEN: No, --10 MS. HOLMES: Go ahead. MR. WISCHHUSEN: Actually the --11 MS. HOLMES: Help me out. 12 13 MR. WISCHHUSEN: Their is a computer 14 model that will predict the performance value for 15 a tire design. And then the validation is to do the interpolation between the tested to show that, 16 indeed, my predictive number falls on that 17 18 interpolated line. 19 So, it's kind of a two-step process. 20 MS. HOLMES: So is there -- if the 21 Commission, and I'm not suggesting that they will, 22 but if the Commission were to accept that kind of 23 an approach for purposes of this rulemaking, is 24 there a problem with us specifying that particular

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approach where there is some combination of

modeling and testing, as opposed to what I'm 1 2 hearing you suggest at this point, which is just we'll figure out how to do it, ourselves, and Ray 3 4 saying he's very uncomfortable with it. 5 So, I'm asking whether there is some way 6 to draft a program that specifies the way that the 7 combination of ISO testing and modeling would be 8 used. MR. WISCHHUSEN: I think, yes, there 9 could be. I mean I can't tell you exactly what it 10 would be right now, but, yes. I mean that's a 11 fertile ground for discussion. 12 MS. HOLMES: That was my only question. 13 14 MR. TUVELL: And I hope I didn't belabor 15 the point, but for some reason I think there's a failure of communication on this issue where 16 you're understanding where we're coming from. 17 18 We're trying to -- I'm foreseeing a 19 situation maybe different than yours. And so 20 maybe I want -- it would be useful for me to 21 characterize the situation so you can understand 22 better where I'm coming from. I don't necessarily see a circumstance 23 24 where it would be acceptable to report a letter or 25 bin. I see a circumstance where it's going to be PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

1 more desirable to report a number. Okay.

2	Now, we can define fairly
3	straightforward the basis for doing that.
4	Somewhat similar, for example, we could build off
5	of what's going on in the OE marketplace.
6	We know, for example, we've talked to
7	people at Ford; they ask you to submit a sample
8	size of three tires, rolling resistance on three
9	ties, and they take the mean.
10	We could go by definition, that's it.
11	By definition the rolling resistance of that SKU
12	tire would be 28580 test of three tires and we
13	take the mean and that's it, by definition. And
14	we'll say that's representative. That's what
15	they're doing in OE right now, seems to be
16	working.
17	Or you can come out with different
18	methodologies. You would say sample size of
19	three, take the mean, add two standard deviations.
20	Fine.
21	It's a definitional issue, okay. And
22	then you could use that number and say here they
23	are, this is each one of Cooper's tires, this is
24	each one of Goodyear's. And it was based on that
25	definition which we just defined.

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And so it's in the context of trying to understand the potential for such a system that I start thinking about then how do we get data that could feed into that system.

5 And my sense is that 28580 could 6 definitely do it for me. But this whole matter of 7 computer modeling capability of the industry to me 8 is nothing but a black box. I mean I have to tell you, I have no idea what goes on; no level of 9 10 confidence in how I can compare results against each other to assure this ultimate goal that I 11 have of, you know, telling the consumers that our 12 13 database is based on reliable numbers that can be 14 compared one against the other. Okay.

15 Regardless of what we end up putting in 16 the rating system we get out in the public, we 17 have to have this level of assurance of a reliable 18 base of information that underlies this, or it's a 19 house of cards.

And so that's where I was trying to go with this, and where I was trying to go this morning on the reliability of the 28580 test. Because everybody is representing to me that the 28580 group did a hell of a good job. And they've come up with a fairly accurate system.

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Because that's what was perceived as the
 need in this industry way before I got involved in
 this stuff.

4 MR. ROBINSON: Ray, Tim Robinson, again. 5 Sorry, but I guess I don't understand the need for 6 reporting exact data on a specific tire, as long 7 as we report what's required of the tires, what 8 bin or what category it fits into.

9 And it's the tire manufacturers' responsibility to assure that if we say it's a 10 three star tire, it's a three star tire. And we 11 do that now with UTQG, we do it with UTQG 12 13 primarily, but we assure based upon modeling and 14 test repeatability and tire-to-tire variation that 15 it fits within the category that it's designed for. 16

17 So I guess the question is why would you 18 need all that information to assure, when all you 19 need to do really is audit periodically and say, 20 Bridgestone said this is a three star tire, we'll 21 test it, we'll see if it fits within the bin that 22 we've already prescribed as a three star tire. If 23 it fits in then it's okay.

24 Why do you need to manage all that 25 additional information? It just seems to me like

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excessive cost and expertise that's required by
 the CEC.

3 MR. TUVELL: Well, Tim, I appreciate you 4 bring it up because I think this is another one of 5 the problems where communications have let us all 6 down.

7 I don't know why somebody presumes8 there's going to be a star system.

9 MR. ROBINSON: Oh. It doesn't have to 10 be a star; whatever system it is.

11 MR. TUVELL: What if it turns out to be 12 a number system? If it turns out to be a number 13 system you need numbers.

14 MR. ROBINSON: Well, or you need a 15 minimum number, say we say a 10 equals an 80 on a 16 scorecard system. We would self-certify that this 17 tire meets an 80.

So then you would test it through an auditing system; say, okay, it meets at least an 80, even if it's an 81 or whatever.

I don't see why you need all the information, because then you have to manage it all. We have to report it all, we have to measure it all.

25 MR. TUVELL: Well, --

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MR. ROBINSON: -- just for you to 1 require the expertise then to go through and 2 analyze it. 3 4 MR. TUVELL: Well, no, I understand and 5 I appreciate those issues, and you're absolutely 6 correct. There's costs and manpower associated with all of this for all of us. 7 8 And it's one of the points that I tried to get across in our last workshop. The Energy 9 10 Commission is different, and historically has been different in how we deal with products than does 11 NHTSA. 12 Our history is based on energy 13 14 efficiency types of requirements on products where 15 mandatory testing is the backbone of it. And significantly detailed data systems exist 16 throughout. You name it. Windows, appliances, 17 18 cool roofs, the list goes on. Be happy to show you the data that we manage and how we go about 19 20 doing it. 21 So I want to assure you this is not

22 something unique to the tire industry, we're going 23 to come in and find the most -- no, we do this all 24 the time, and we're very familiar with what's 25 required to do it and handle it. Okay.

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The issue here, to us, principally is 1 2 where do you get this accurate information to even start with. Because that's what the consumer is 3 lacking right now. They can't look at a tire and 4 5 identify energy efficiency. I can't look at it 6 and neither can you, probably, although you have, 7 I'm sure, a lot more history than me. 8 How do we get an accurate base of information by which we build a system on? 9 10 MR. ROBINSON: Well, I think that's what 11 we just described what our proposal would be, is to, you know, use our star rating system using a 12 13 self-certification type basis. Tying it to miles 14 per gallon saved, which I think is sufficient to 15 meet the requirements of the regulation. MR. TUVELL: Okay, And so, but you 16 understand my point, I think, that --17 18 MR. ROBINSON: Yeah, I understand your 19 point, Ray. But the option you have is auditing by a third party or whatever, to assure that we 20 21 are in compliance. Which would save us a 22 tremendous amount of burden in the tire industry to do all the additional testing, all the 23 24 additional reporting when we have all these models 25 in place.

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And what it will do is it will drive our models to be more precise. It'll drive our repeataBility to be more narrow, such that we can rate tires in a higher category.

5 MR. TUVELL: Okay, so, let me put this 6 challenge out for you. How do you help me attain 7 a level of comfort about what you're models can 8 do, and can it overcome the concern I have about 9 comparing data from Bridgestone versus Michelin 10 versus Goodyear.

How do you -- I mean, this is your -- I don't need the answer now, go back and think about it, you need to help me overcome that problem. Because I don't know how to overcome that now, because I've never seen your model; they're not public domain; they've never been tested against each other.

18 It's coming down to take my word for it,19 Ray.

MS. HOLMES: Just a question.

21 MR. ROBINSON: Right. With the ability 22 for you to audit and check. These models are 23 proprietary, as Mike mentioned. Everybody has 24 their own proprietary models. They're all based 25 upon finite element analysis. They're the future

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of tire production, tire development.

We try and do less testing, more 2 modeling, because testing is very expensive. 3 So 4 that's the wave of the future. MS. HOLMES: Is there information that's 5 6 publicly available that could be brought into this 7 proceeding that correlates the results of the 8 models with the test results using the ISO test, in particular? 9 10 So that instead of you're saying, trust us, our models, we have lots of economic 11 incentives to make our models work. 12 You could actually provide us something 13 14 that shows some sort of data that shows a 15 correlation between your results, the results of your models and the results of the testing that we 16 would like. 17 18 See, I'm trying to figure out how to 19 bridge this gap. 20 MR. WISCHHUSEN: Yeah, I think there are 21 probably several papers on the use of finite 22 element analysis techniques for predictive modeling and tire design. That, I think, exists. 23 24 Now, the link to 28580 I'm less certain about just because of the shift in time. That 25

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finite element work was done several years ago 1 2 before 28580. But there would be, you know, a critical 3 4 part of a scientific paper is the validation by 5 testing. 6 MS. HOLMES: Right. 7 MR. WISCHHUSEN: Probably either J1269, 8 you know, the old SAE procedure, or the older ISO 9 procedure, but we showed earlier this morning that 10 all of that --MS. HOLMES: Right, right. So the --11 right. 12 MR. WISCHHUSEN: -- procedures match the 13 14 new procedures. So, it would be compared to a testing --15 MS. HOLMES: I'm just offering it as a 16 suggestion, --17 18 MR. WISCHHUSEN: Yeah. MS. HOLMES: -- as a way to bridge the 19 20 gap. MR. WISCHHUSEN: We'll look for it. 21 MS. HOLMES: If there's data available 22 that can give us confidence, something other than 23 24 trust us, that those models provide reasonable representations, that would be good. 25

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Particularly if it's tied, as I said, to 1 2 a requirement that a certain amount of testing be 3 done. 4 MR. WISCHHUSEN: Yeah, finite element 5 analysis techniques are open market. I mean 6 they're out in the market. What becomes 7 proprietary about the models is how we handle 8 material properties and what the specific properties of our proprietary materials are. 9 MS. HOLMES: I'm familiar with finite 10 element models with groundwater modeling, not 11 tires. 12 13 (Laughter.) 14 MR. WISCHHUSEN: At some level it's the 15 same. MR. TUVELL: I wanted to present this 16 slide just very importantly, to try to get this 17 18 issue in context. I want you to see another way we look at this matter of positive testing 19 20 relative to individual companies. 21 This is -- I pulled this 2008 North America sales data out of the tire business. 22 Public document. Goodyear, 7 billion plus; 23 24 Michelin, 7 billion plus; Bridgestone, 7 billion plus. I'm telling you numbers you don't 25

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1 understand, I mean that you know.

2	And this is North America, by the way,
3	not global. Probably multiply each of those
4	numbers by four or five to get global sales. I'm
5	not exactly sure.
6	The test costs are the numbers that was
7	presented by Bruce Lambillotte of Smithers at our
8	February 5 workshop, again. And
9	MR. ROBINSON: I'm sorry, Ray, those are
10	based upon the capacity
11	MR. SPEAKER: Come up to the mic.
12	MR. ROBINSON: I think that's where we
13	have an issue again. This is Robinson from
14	Bridgestone. I think that 's where we have an
15	issue that, in our opinion, over-stated excess
16	test capacity of 25 and 50 percent.
17	That, to us, is unrealistic.
18	MR. TUVELL: No, I understand. I hear
19	you, and I requested more detailed breakdown of
20	how you got your estimates so we can better
21	understand that.
22	And so that's why I'm saying this is
23	where the source of our numbers came from. And so
24	I just did a sample division and took those test
25	costs and divided by North American sales to get
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1 percent of sales.

2 So, if our numbers are accurate, the test costs that we would -- some sort of a 3 4 mandatory testing of all SKUs would impose, for 5 Goodyear would be a .016 percent of sales. 6 Now, yes, it's a bad economy, and I'm 7 not going to shortchange anybody on dollars. And 8 I'm not going to suggest that that's, you know, lost in the noise. I'm not saying any of that. 9 10 I'm trying to present this stuff in context. 11 Okay. My concern is Cooper's. Frankly, I mean 12 13 those numbers are big because of the SKUs. 14 Because of all the -- and I'm pretty much sure you 15 don't have a lot of testing capacity because you're not in the OE business. 16 17 And so I look at this as a company-by-18 company issue, and would like to understand it that way, and like to see the data presented that 19 20 way. Because then we can deal with it that way. 21 But lumping it all together, the 22 industry as a whole as one and the same and all in the same basket, no, it's not. It's not. Okay. 23 24 And so it's not helpful for us to see this stuff all lumped together. It confuses and 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

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compounds the issues in ways that are just not very helpful to advancing these subjects, to us.

3 MR. MEIER: I've got a couple questions
4 related to this, that's why I suddenly got really
5 eager to ask a question.

6 Do you know how much it costs per tire, 7 or something like that, to put on this label? Did 8 you divide this by the number of tires, the 20 9 million or the 1 million. So it's cents per tire 10 cost?

MR. WISCHHUSEN: I don't follow what you're asking.

13 MR. MEIER: Well, if you took the total 14 cost of this information program and divide it by 15 the number of tires, presumably it's going to be a 16 certain number of --

MR. WISCHHUSEN: Well, you know, if you
look at the cost numbers we presented, you know,
on one of these slides --

20 MR. MEIER: Yeah.

21 MR. WISCHHUSEN: -- and you know the 22 approximate number --

23 MR. MEIER: Number of tires.
24 MR. WISCHHUSEN: -- of tires sold, -25 MR. MEIER: So it's a very small

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fraction of a penny per tire. And do you have any 1 idea how it is in other products that have energy 2 labels? 3 Because, you know, almost -- these 4 5 singular labels exist in refrigerators, air 6 conditioners, and radios and televisions, I guess, 7 if they're EnergyStar and everything. 8 So it's not that unusual a burden to get an energy label on a product. And somehow they 9 10 figured out how to do the costs. But it would be interesting to compare 11 the costs, the testing costs in these different 12 products, because I don't know. It might actually 13 14 be very different. But I wanted to ask a couple other 15 questions about testing. So when you send a --16 when an automobile manufacturer requests 17 18 information about your tires, how do you report to them? What do you report to them in terms of 19 20 data? Is there a form or something that you might even be able to show us? 21 22 MR. WISCHHUSEN: One of the guys that worked more with the OEs want to field that one? 23 I don't do a lot of OE work. 24 25 MR. GUINEY: There's two types that I'm

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familiar with. One is they present us a target specification that is an RRC number. And then they ask for test reports.

4 So if we generate a test report off of 5 our test machine, they can ask for that complete 6 test report. And they do.

7 If I go out to an independent laboratory
8 and attain that, we send them that complete test
9 report.

10 So they utilize all of the data from a 11 typical test report for their purposes, however 12 they -- whatever the -- and that's a key point. 13 It ends up being whatever the customer demands. 14 And the customer understands the cost of what they 15 demand sometimes.

MR. MEIER: Right. Because I saw some numbers that range from the manufacturers requiring three tires, PSA, and France requires ten tires to be tested. It makes one wonder, well, why do they have those differences. And I think you explained that.

22 MR. GUINEY: Yeah. It all goes back to 23 what they do internally in their own engineering 24 protocol to do something with that.

25 And we meet their requirement, is the

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1 best answer.

MR. MEIER: Okay. Can I go back to that 2 graph, because now I want to talk about 3 4 alternative rating systems. 5 I thought this was a very useful plot 6 because it showed the 95 percent confidence level 7 of each of these tires. And that is to say that 8 the top of each of those bars equals the -- you're 95 percent confident that the value is that or 9 10 below what's reported there. MR. ROBINSON: Well, the mean is within 11 that range. 12 MR. MEIER: Yeah, yeah, that SKU, 13 14 because you're testing them, that product run is 15 going to be less than the top of that. So that here you could say, as an 16 alternative rating system, you could say look, you 17 18 simply test these models and report that top value, the value that's right at the top of the 19 20 bar. And we're saying we're 95 percent confident 21 that the rolling resistance is equal to or less 22 than that value. 23 Is that -- that's an alternative way of reporting the data, isn't it? 24 25 DR. HAWLEY: Let me suggest what Mike --

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1 THE REPORTER: Can you come to the 2 microphone, sir?

3 DR. HAWLEY: Just one particular problem 4 that might arise if you do that is exemplified by 5 looking at the bars at about number 45 or so, that 6 have relatively wide error bars there.

If you look at the top of those, say at
11, and you go over to the right, there's a large
number of bars that have lower -- excuse me,
higher average rolling resistances than that, and
lower tops of the bars.

12It would appear that the tires with the13very large bars have higher rolling resistance14than some of the tires where the averages are15actually lower than the averages for those.16I'm not sure I've expressed that --17MR. MEIER: Yeah, I understand exactly

18 what you're saying, --

19 DR. HAWLEY: Okay.

20 MR. MEIER: -- and there are two things 21 going on. One is you see those tires at 49 that 22 have very high large bars, if you wish, confidence 23 bars. Those, we know there's a lot of product 24 variation in them. And there's a strong -- that 25 makes the manufacturer have a strong incentive to

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prove quality control and make that narrower so 1 that they can confidently report a lower value, 2 isn't that correct? 3 4 DR. HAWLEY: I think that's probably 5 true. I just --6 MR. MEIER: Yeah. DR. HAWLEY: -- point those out because 7 8 those --9 MR. MEIER: Yeah. DR. HAWLEY: -- those are the most 10 11 obvious examples. MR. MEIER: And there's still another 12 13 problem here, because this doesn't exclude the 14 alignment error. And so we have to figure out 15 well, how much more would the manufacturer have to add to include the alignment error. 16 17 I thought it was only going to be a few percent; and now I'm not sure, after this morning, 18 but it sure makes me concerned if we have to add 19 20 another 20 percent or something like that, to 21 account for alignment error. That just doesn't 22 ring right with what I've seen before. 23 But it just seems to me that right here 24 is basically a reporting done with 95 percent 25 confidence that the value you're reporting to the

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California Energy Commission is equal to or below
 that.

DR. HAWLEY: Agreed, but if you put 3 4 those values out in front of the consumer, 5 sometimes he's going to be selecting a tire that 6 he thinks has a lower average rolling resistance, 7 and getting a tire that actually has a higher 8 average rolling resistance. 9 MR. MEIER: You mean, so people want tires with higher rolling resistance? 10 DR. HAWLEY: No, --11 MR. MEIER: Well, yeah, but I guess what 12 happens is, I mean there's an incentive for the 13 14 manufacturers to reduce that certainly so they get much closer to the actual value. But, --15 DR. HAWLEY: And, if the variability and 16 width of the error bars was consistent across all 17 18 the products, then what you're suggesting would work just fine. But it to be essentially the same 19 20 in terms of the order of the tested tires, it 21 would be the same whether you ranked them on the 22 basis of the average or on the basis of the 95 percent --23 24 MR. MEIER: I just think it's been -that creates greater incentive for the 25

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1 manufacturer to reduce the product --

2 DR. HAWLEY: I understand. MR. MEIER: -- product variation. But I 3 4 just wanted to present that as here's an 5 alternative way to report the data. It's been 6 done. 7 We've got one more little addition, we 8 have to worry about the alignment, which I don't know what that increment for the alignment would 9 10 be. But it's there. It's completely set. 11 And we also know how to verify it. Somebody, a test lab can come in, test the tires, 12 13 and they can find for a sample of ten tires what 14 the variation is, and what the 95 percent confidence level is. 15 And so there's a symmetry, and they can 16 17 easily verify that there is accurate reporting. 18 MR. TUVELL: Not for you, Mark. 19 (Laughter.) 20 MR. TUVELL: Ray Tuvell, again. I think 21 that one of the things that you're hearing from 22 us, and it's a core perspective that I would like to make sure you understand. 23 24 As things have evolved now, we're seeing a lot more of what we're trying to accomplish here 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

in the direction of value for the program that 1 we're putting together, as similar to what's 2 happening on the OE side of your business. 3 4 Where it seems to be, in seeing a great 5 deal of consistency with what we're seeing as. 6 gosh, this stuff is important. They mandate the 7 testing. They've come up with a sample size. 8 They've figured out a method that reduces to one 9 number. 10 And you guys have been living with that for quite some time, you're used to it. You know 11 what it is. It works. 12 And so we see that, too. And we see a 13 14 great deal more of value what that yields as 15 opposed to the comparisons that we heard consistently from the industry about oh, no, the 16 better way to compare what you need to do here is 17 18 the UTQG system that NHTSA runs. 19 It's important for you to understand 20 that we don't see that, and never saw that as the 21 model we wanted to build a program after. And my 22 friends from NHTSA here understand when I say this, it's no criticism of them. Because they've 23 24 been very candid and forthcoming with me about 25 concerns about the program, themselves.

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And we never saw that as a good model to build off of, for many many reasons. And you touched on a few of those in your presentation. And, by the way, just to clarify a few things about that. And I'd suggest, if you get a chance, you might want to take a look at this independently.

8 On the UTQG there is extremely limited 9 amount of independent verification done by NHTSA. 10 Due to just what you would expect, limitations in 11 funding for government agencies to run that side 12 of their programs.

13 So, to suggest that that is a good model 14 because look how well it has worked in the past, 15 and look at all this great independent testing that's going on, and they've done this 16 verification and they haven't found these 17 18 problems, I've looked at that in detail and I understand it in detail. I would encourage you to 19 20 look at it in detail. I would think you'll find, 21 if you didn't already know, there's not much 22 there.

And so we know that, and we understand that as another limitation of those types of programs. In fact, does shift a heck of a lot of

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burden to the government. And if the government
 is not in a position to pick up that burden, it
 doesn't work.

4 By the way, I was extremely encouraged 5 about the comment, what I thought I heard you say, 6 Mike, about you see the value in changing the UTQG 7 system so that derating is not allowed. And I 8 would love to see the industry take that statement publicly, and that you would endorse and support 9 10 NHTSA changing that, the UTQG program, so that 11 derating is not allowed.

12 I think that's a huge step in the right 13 direction. And it would be a great thing for the 14 industry to step forward and we're behind it, 15 we'll support NHTSA do it. It's a problem for us, 16 do it, NHTSA, we'll support you.

So I'd love to see you folks follow through on that. You obviously see the shortcomings. Follow through. Support them in making that change.

21MR. ROBINSON:I'll make one point.22Again, Tim Robinson from Bridgestone.

Ray, we understand all your concerns,
but let's not lose sight of the prize here. I
mean the whole objective is to reduce rolling

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resistance and improve fuel efficiency for the
 state of California, and obviously for the whole
 world.

We think we can do this, the RMA's position is we think we can do this for the lowest cost through self-certification. And have as much accuracy as we would by testing and reporting on almost every single tire. Much less cost.

9 So, the RMA position, we feel that we can do this. We can achieve all of our goals. In 10 addition to that, improved tires by reducing fuel 11 efficiency and create competition within the 12 13 marketplace to eventually force more tires from 14 the three or four star categories into the five. 15 And then maybe later on shift the scale, whatever, to make the 5s a little lower or 16

17 whatever, or add a sixth star or seventh star, or 18 whatever.

So we think we can do that through self-certification. Thanks.

21 MR. PETERSEN: This is Gene Petersen
22 with -23 MR. SPEAKER: Microphone.

24 MR. PETERSEN: This is Gene Petersen 25 with Consumer Reports. I just had a couple

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middle-of-the-road questions for anyone to answer. 1 2 First, the alignment costs. I know it's a proposal, but did you make any attempt to 3 4 analyze what that would cost? 5 MR. WISCHHUSEN: I didn't participate in 6 the committee; I'm looking for Dan, who did. But 7 I think there was some discussion about the cost 8 of the alignment procedure. 9 MR. GUINEY: Acquisition, obviously 10 acquisition costs of the alignment tires; delivery cost of the alignment tires was considered. 11 As well as just the testing of the alignment tires. 12 13 So you could use those three categories, 14 tire cost, delivery and testing cost of the 15 alignment tires. Analysis. Like somebody said, computers. 16 MR. PETERSEN: I just had a comment that 17 18 a number of SKUs report. I was wondering if that was under-estimating what might be available. 19 20 Because I was thinking back that, you know, each 21 time an existing model, components may change, 22 change the suppliers, or change of plan, different techniques in building it would require going back 23 24 and retesting them. 25 MR. WISCHHUSEN: Maybe I misunderstood

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your question. I thought you were asking if that 1 number of SKUs we used, which was 24,000, if that 2 really under-estimated what was actually out 3 4 there. 5 MR. PETERSEN: That's correct, that's my 6 point. 7 MR. WISCHHUSEN: That may very well be 8 the case. I think when the industry went through its version of how many SKUs do we have, it was 9 how many active SKUs did we have. 10 MR. PETERSEN: Okay. 11 MR. WISCHHUSEN: Now, it's an 12 13 administrative procedure to me to say this SKU is 14 now inactive. But there may still be thousands of 15 them out in the marketplace, in dealers' inventories, waiting to be sold. 16 17 So the population of SKUs may be a 18 little bit more than the number that we consider active SKUs. So there probably are more tires out 19 20 there than what that number shows. 21 MR. PETERSEN: Okay. And then listening 22 to the challenge that Ray was talking about, in getting a real number. And going through this 23 24 modeling thing and so forth. 25 Ray, I was just wondering, do you really

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1 know, do you really need to know where the number 2 came from? For instance, if they just gave you a 3 number and if they're tied down to the penalty of 4 a self-certification process, wouldn't that be 5 sufficient?

6 MR. TUVELL: Yeah, understand the number 7 issue in this context for us, okay. I'm looking 8 at the underlying credibility of the program, as a 9 whole, okay.

10 What's the basis for it? What is this 11 program built on? So that ultimately if any consumer, or you know, you at Consumer Reports, 12 13 want to go back through the details and say, I 14 want to see, what is underlying this. I want to 15 know if I can develop independent confidence in this program as a whole. Let's say it ended up 16 being a five star program. That you could dig 17 18 down and find it.

19 So far, right now, the only basis we 20 have determined to develop a level of confidence 21 in determining, assessing the energy efficiency of 22 a tire is the testing. Either J1269 or 28580. We 23 know of no other basis for doing that. It yields 24 a number.

25 It's a number that has been used

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commonly in this -- it's used by OEs day-in and 1 2 day-out. And apparently it works. And it works to the hundredth, because those numbers are 3 4 commonly out there to the hundredth. 5 And so we looked at it and said, 6 fantastic. Fantastic. In fact, they're making it 7 better with 28580 by coming up with a machine-to-8 machine alignment process. So now we can compare 9 numbers from machine to machine. 10 So we look at that and we go, these 11 numbers provide the underlying basis for the program, as a whole. Anybody can check it and 12 13 say, okay, I got some confidence here. I've got

And I have yet to see come forward some other basis or a proposal for a basis that could yield anywhere close to that level of confidence. Without that confidence these government programs are meaningless. They're meaningless.

some confidence here.

14

20 And unfortunately, I think, it's also 21 part of the reason why it's one of the 22 shortcomings of UTQG. And there's many reasons. 23 I mean once I understood in depth how the UTQG 24 numbers were determined, and it's part of a self-25 certification, the minimum part is the testing.

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1 It's just kind of like I don't have any confidence
2 in it, either.

3 MR. PETERSEN: Here's the question. Do
4 you see the state of California being very active
5 in doing auditing?

6 MR. TUVELL: Absolutely. Absolutely. I 7 can -- budget is simply not a problem for me on 8 that issue. This is a very important program to 9 the state of California. I don't have problems 10 getting money for this program. I can put 11 together a very aggressive auditing program and 12 fund it.

And one other point on the testing costs and stuff like that that I wanted people to keep in mind. Hey, look, if it's going to cost you a lot to run the test, I have people who will run the test for me pretty darn cheap. I'd suggest you use them.

19 The analysis we did and presented at our 20 February 5 workshop was simply testing capacity of 21 the industry. We did not include independent 22 testing capacity. I mean I have a sense what they 23 are out there. I know exactly what they cost 24 because that's what they charged me.

25 If it ends up being as expensive for you PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

guys as you represented up here, I would want to 1 make a suggestion. Stay out of the business. 2 Go to the independents. You're going to save a heck 3 4 of a lot of money getting your testing done. Thev 5 do a very good job, by the way. And they're 6 quick, and I can depend on their price structure. 7 You'll save a lot of money. 8 MR. WISCHHUSEN: All right, I finished my presentation a long time ago. 9 10 (Laughter.) MR. WISCHHUSEN: If there are no more 11 questions -- Julie? 12 MS. ABRAHAM: One quick question on --13 14 THE REPORTER: Could you come to the 15 microphone, please. MS. ABRAHAM: Sorry. This is Julie 16 Abraham from NHTSA. Mike, just a very quick 17 18 question. The number that you reported, the cost numbers that you reported, you said that's a 19 20 testing cost. Is that testing and recording, or 21 just simply testing every single --22 MR. WISCHHUSEN: It was testing. We didn't add a separate number for reporting, but --23 24 MS. ABRAHAM: Is there a cost associated with reporting the data to the government? And, 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

if so, what is that cost?

MR. WISCHHUSEN: There will be some IT 2 type overhead costs. You know, you're going -- if 3 4 you don't have server capacity to do the 5 information transfer. 6 I'm thinking back to early warning. 7 Now, this is nowhere near the magnitude of early 8 warning, but you have that sort of infrastructure 9 requirements which I suspect everybody is probably 10 pretty well set for. You may have some software development costs upfront, and then maybe a small 11 ongoing maintenance cost for it. 12 My gut feels it's small compared to like 13 14 the hardware costs and the personnel costs of 15 staffing the test machine. MS. ABRAHAM: But you pretty much you 16 17 guys would keep a record somewhere in your company 18 of what every tire would -- and some spreadsheet form of --19 20 MR. WISCHHUSEN: Yeah, I would --21 MS. ABRAHAM: Regardless of whether it's 22 tested or modeled or what-have-you, you would have a --23 24 MR. WISCHHUSEN: I would suggest --25 MS. ABRAHAM: -- record of that --

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MR. WISCHHUSEN: I would suspect or I 1 2 would anticipate that data retention would be part of the regulation. I mean we'd be told how long 3 we had to keep the information. 4 5 You know, we, internally, have our own 6 data retention policies, but they are overridden 7 by regulatory requirements. 8 MS. ABRAHAM: Okay. But I guess what I'm asking is not just simply whatever rating it 9 is, but you would keep the actual numbers, whether 10 it's RRC or RRF or, you know, whatever it is. You 11 would have that somewhere in your record? 12 13 MR. WISCHHUSEN: Now that may differ if 14 you did it by -- if you actually ran the test. If 15 you actually ran the test, yes, you got the test 16 results. If you do modeling to interpolate the 17 number, you've probably got some sort of a report 18 coming out of that finite element analysis, but --19 20 MS. ABRAHAM: Um-hum, but some --21 MR. WISCHHUSEN: -- I suspect, I suspect 22 somewhere there --MS. ABRAHAM: -- number --23 24 MR. WISCHHUSEN: -- would be something that would say this is why we gave it this value. 25

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MS. ABRAHAM: Okay. Thanks. 1 2 MR. GUINEY: Dan Guiney, Yokohama. Ray, if I understood the basis for the foundation for 3 4 wanting to dig deeper and understand the 5 underlying foundation of everything that's done, I 6 guess the question I would have, do you have a 7 sense of how many consumers in the state of 8 California that are buying tires for a vehicle would ever do that? 9 10 MR. TUVELL: Go down to that level of detail? Yeah, I talked to John Rastegger 11 (phonetic) at TireRack a lot about this stuff. 12 I 13 don't know if you folks deal with the TireRack. I 14 mean one of those reputable groups out there. 15 And he readily admits that his consumers are a different breed of folks. He and I think 16 it's a relatively small percentage, definitely 17 less than 10 percent, probably less than 5 percent 18 that would actually dig deep to look at the data. 19 Okay. That's ny sense, too. 20 21 MR. GUINEY: And then the underlying 22 foundation of the data. You mentioned we got to 23 go all the way to the underlying foundation --24 MR. TUVELL: Yeah, yeah, here's what I meant by that. The initial question in my mind 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

that the vast majority of consumers, and I think 1 2 Gene said that, and we've heard this over and over again from retailers, the vast majority of 3 4 consumers do little or no research on tires. You weren't at the November 5 6 presentation, the roundtable. We talked a lot 7 about the stress purchases. They come in, I need 8 a tire, I need it now, get me out of here quick. What do you got in stock. Boom, that's it. 9 10 That's it. And so without a doubt we need to come 11 up with a rating system that works in that 12 13 environment better than any other. Okay. Better 14 than any other if we're going to be successful, 15 because that's how the vast majority of products are sold, we think, here. 16 But understand, see, that's different 17 18 than what underlies the program. I got to be 19 able, ultimately when I give that information to, 20 you know, that soccer mom who needs her tires, she needs to understand there's a level of confidence 21 22 behind it. No different than, here's an example 23 24 I've used time and time again. Any time you go 25 out to buy a food product you will see a nutrition

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label on there, okay. Now, you may or may not read it. I have to at my age or otherwise I' 2 going to get like this.m 3 4 I have a level of confidence in that 5 information because there's a government program 6 behind it that specifies exactly how the testing 7 was done, exactly how you can report that 8 information. It has a confidence behind it. 9 And that's what we need to establish for 10 this program. A level of confidence behind it for anybody who wants to trace it back to its source. 11 MR. GUINEY: Correct me if I'm wrong, so 12 the confidence building is for the government 13 14 agency, not for the end user. MR. TUVELL: It's for everybody. I 15 mean, we're not -- there's no way I'm going to be 16 17 able to go to our Commissioners here and say, 18 willing to develop a program, by the way, and it's based on data where we're just kind of accepting 19 20 information because people say, here, take our 21 word for it. They'll throw me out in a second. MR. WISCHHUSEN: Yeah, I understand. 22 MR. TUVELL: Okay. It's for the 23 24 sanctity of the program as a whole. It's for everybody involved. It's for us that are running 25

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it. It's for the public that's trying to use it. 1 2 It's for the retailers that are using it to sell. It's for you guys to advertise your 3 4 product. Think of it, I mean this is one way I 5 always kind of looked at this, man, I can make 6 your life so simple. I'm going to get all this 7 great data on every Michelin tire made, Dan. Now 8 you know exactly what your competition is like. You don't have to do any testing, yourself. You 9 just market your tires. 10 Now you can go out to the public and 11 say, we've looked at the data. Here, you can look 12 13 at it. Our tires are better than Michelin. Wham, 14 bam. 15 MR. SPEAKER: Save you money, too. MR. TUVELL: And I know I'm going to 16 17 save Gene money because he's not going to have to 18 do any rolling resistance testing anymore. He's 19 going to love me. Okay. 20 So, I look at this also as something 21 that, we're a whole advantage to the industry. You got reliable data you can use in your 22 advertising, and make claims about your products. 23 24 I mean I'm just going to win/win. 25 Is there a cost associated with it?

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Yes. Are there logistics associated with it? Yes. Okay.

We're not as bothered by that side of 3 it, because we're used to doing that. We do it 4 5 with all energy efficiency products. But we 6 appreciate and understand the impact on this 7 industry, and that's why we're trying to nail this 8 down in some specifics. That's why I paid 9 Smithers to do the analysis, to come up with some 10 reputable numbers that I can use to get a grasp of it. 11

MR. GUINEY: So the confidence we have 12 13 with our proposal has to be transmitted to you --MR. TUVELL: Well, I --14 15 MR. GUINEY: -- as the agency? MR. TUVELL: Well, what I've tried to 16 explain, Dan, is where I have concerns about the 17 18 proposals that I'm hearing from the industry. But, also, understand, I've never, and still today 19 20 I couldn't tell you exactly what the detail 21 proposal of the industry is. 22 I'll give you a perfect example. Maybe this is a -- and if you don't want to answer this, 23 don't. 24 25 Is the industry committed to ISO 28580

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as the test protocol for this program?

2 See, I've never heard the industry step forward and say, ISO 28580, we're happy, get it 3 off the board, let's go. Next issue. 4 5 MR. GUINEY: I think in the one workshop 6 I was in that we discussed that, we said that we 7 believe we understand the transition between the 8 two, and we don't see a problem. I believe that's what we said. 9 10 MR. TUVELL: Okay, no, I heard it that way. But, see, that's not as clear as saying the 11 industry accepts ISO 28580 as the official test 12 13 protocol for the Energy Commission program and the 14 NHTSA program. Done issue, guys, let's focus on the real issues. See, it's --15 MR. GUINEY: That's another note we'll 16 17 take --18 MR. TUVELL: Yeah, see, I mean I would love to get a clear understanding of where the 19 20 industry is coming from on each one of these 21 issues today. Because I couldn't tell you right 22 out, what is the industry proposal. I couldn't tell you. 23 24 I mean I'm getting little pieces every now and then, but I still don't know what it is. 25 PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

I still don't know what it is.

2 So, yes, as you put it, am I lacking in confidence, yeah, I don't understand. How can I 3 4 be confident? I don't get it yet. 5 MS. NORBERG: Maybe just because I think 6 it's 5:18, and maybe if we can kind of wrap up in 7 a way that I think we understand and hear your 8 needs. And maybe we can take all of this good discussion and discuss among our members how we 9 can try to provide you with the clear explanation, 10 11 I guess, of the proposal. I thought we kind of got through that 12 13 today, but we can take another stab at it during 14 the comment period and submit our comments for the 15 record to try and clarify so that everyone understands where we are -- where we stand, as an 16 industry, on test methods on the RMA proposal. 17 18 And we can discuss internally the 19 conversation that we've had just now, and how we can be responsive to I think what we're hearing. 20 21 If it's helpful, we can do that and get back with 22 you during the comment period. 23 MR. TUVELL: I really appreciate that. 24 And, throughout the presentations today I've made 25 numerous requests for -- more specific requests, PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

you know, for data and breakdowns and that sort of stuff, you know, that frankly is complicating things for us.

It's dragging on. We're not getting the level of specificity we need. We're pretty much getting to the point where we're concluding it is not going to be forthcoming, you know, you expecting it any more, time to move on.

9 MS. NORBERG: Yeah, I'm sorry, you may 10 have missed what I said after the break, but now 11 that we've heard all the input on the data 12 analysis and Mark Hawley's presentation, that we 13 will be adding that data report and providing a 14 data report on the underlying data at the end of 15 the comment period from this workshop.

16 I'm sorry, you may have been out of the 17 room when I stated that here. But that's 18 definitely our plan, and I'm sorry if others 19 didn't hear about it, but that's definitely our 20 plan.

21 MR. TUVELL: Yeah. 22 MS. NORBERG: And I did state that 23 before --24 MR. TUVELL: And I really appreciated 25 that. And just as on, you know, that outstanding

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list of information requests that our Commissioners submitted, you know, that's still

all very important to us.

4 MS. NORBERG: Well, I think it's, for 5 use, just kind of closing by that list. For those 6 who haven't seen the list, the items on the list 7 are the data, which I think we've covered in 8 detail today. And, as I said about a minute ago, we will be providing the full list of data and the 9 10 report during the comment period, taking into account all of the discussion and additional 11 considerations that we heard today. 12

13 So that -- the second item -- I mean the 14 first item. The second item was a whitepaper on 15 self-certification that we provided you back in June 2008. And we've spent, I think, a lot of 16 time this afternoon going through self-17 certification in more detail. If there's more 18 that we need to provide on self-certification 19 we'll talk about that internally in our group and 20 21 see what more we can provide.

The fourth request was about testing capacity. Mike just gave a lot of information about testing capacity here today. We've heard your concerns and we'll go back and see what more

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1 we can do to give you more detail.

2 I think the challenge with the request to provide the testing capacity data as requested, 3 4 but as Mike explained, the issue is not as simple 5 as that. 6 And so what we've tried to do in the 7 presentation that Mike went through was to give 8 our best assessment of how we would do that in a way that make sense, given the industry's testing 9 10 situation -- so then we can take all the discussion that we've heard today and see what 11 more we can provide. 12 MR. TUVELL: But, on the testing 13 14 capacity, see our request that has been 15 outstanding, It's very simple. Name of company, number of test machines, location. 16 MS. NORBERG: Yeah, I understand that. 17 18 The request was simple, but the answer isn't that simple. And so, I mean -- honestly trying to 19 20 fulfill that request is impossible how it's 21 written. So we're trying to be responsive in a 22 way that is possible. And we will talk internally to see what more we could give you on --23 24 MR. TUVELL: Okay. 25 MS. NORBERG: -- and, you know, provide

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1 comments --

2	MR. TUVELL: Right, and then so I would
3	encourage you to look at that entire list of
4	requests, because it is more detailed and it is
5	very specific. And, as you're restating them now,
6	no, they haven't been forthcoming. And it's still
7	out there. And there are people who want it and
8	are wondering why it's not forthcoming.
9	MS. NORBERG: As I've gone through, I
10	think we've addressed all four. And what I
11	provided, and we can submit additional material
12	during the comment period, and
13	MR. TUVELL: Okay, but look,
14	MS. NORBERG: and we can see where we
15	are.
16	MR. TUVELL: Okay, but
17	MR. SPEAKER: California sales
18	MS. NORBERG: I'm sorry? California
19	sales, right. And that's just not information
20	that exists, so
21	MR. TUVELL: It's not California sales.
22	I can put up the list if you want. But, Tracey, I
23	just I don't want to I hate belaboring this
24	point, but no, we do not believe you're in any way
25	compliant with that request. So, please, don't

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1 imply that, yes, you have supplied all that

2 information and everything is fine.

3 It is not, okay. And until we get it 4 and tell you, yes, thank you, you've satisfied our 5 needs, you haven't.

6 MS. NORBERG: Okay, maybe I can restate 7 what I just said. We will provide the data by the 8 end of the comment period along with the analysis 9 of that data where Mark provided the summary 10 today.

Number two, we've gone through the SKUs and we've addressed those. We think the Smithers' estimates are accurate.

14 Number three, the whitepaper -- I'm
15 sorry if you don't have a copy of what we provided
16 you --

MR. TUVELL: I have.
MS. NORBERG: -- in June. We -MR. TUVELL: I have the whitepaper.
MS. NORBERG: -- completely submitted
that again.

And number four, the testing availability. We've tried to be responsive in the way that it's possible, given the industry's configuration. We will go back and discuss that

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1 further to see what additional information we may be able to provide, and provide that during the 2 comment period. 3 4 And so, just to be clear, I'm not saying 5 that now we have completed the request. I'm 6 saying that I've answered each point today, and 7 that we will look forward during the comment 8 period to be further responsive. 9 Is that clear? 10 MR. TUVELL: Yes, that's helpful. MS. NORBERG: Okay, great. Thank you. 11 And thank you, everyone else, for all the time 12 today. It was kind of a marathon session, but 13 14 thank you all very much. 15 (Whereupon, at 5:25 p.m., the staff 16 workshop was adjourned.) 17 --000--18 19 20 21 22 23 24 25

CERTIFICATE OF REPORTER

I, PETER PETTY, an Electronic Reporter, do hereby certify that I am a disinterested person herein; that I recorded the foregoing California Energy Commission Staff Workshop; that it was thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said workshop, nor in any way interested in outcome of said workshop.

IN WITNESS WHEREOF, I have hereunto set my hand this 1st day of May, 2009.

PETER PETTY

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