

**UNITED STATES DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

1200 New Jersey Avenue SE  
Washington, DC 20590

**In re:**

TQ14-001

NHTSA Recall No. 14V-047

**CONSENT ORDER**

This Consent Order is based on the agreement of the National Highway Traffic Safety Administration ("NHTSA"), an operating component of the U.S. Department of Transportation, and General Motors Company ("GM") to resolve claims associated with NHTSA's Timeliness Query TQ14-001 under the terms and conditions incorporated herein.

**I. NATURE OF THE ACTION**

1. The National Traffic and Motor Vehicle Safety Act of 1966 as amended and recodified (the "Safety Act"), 49 U.S.C. § 30101, *et seq.*, provides for regulation of motor vehicles and motor vehicle equipment by the Secretary of Transportation. 49 U.S.C. § 30111. The Secretary has delegated his authorities under the Safety Act to the NHTSA Administrator, 49 C.F.R. §§ 1.95(a), 501.2(a)(1). This delegation includes the authority to compromise the amount of civil penalties for violations of the Safety Act and regulations prescribed thereunder. *See* 49 U.S.C. § 30165(b); 49 C.F.R. § 1.95.

2. Under the Safety Act, a manufacturer of motor vehicles has a duty to notify NHTSA and owners, purchasers, and dealers of a vehicle if the manufacturer learns the vehicle contains a defect and decides in good faith that the defect is related to motor vehicle safety. 49 U.S.C. § 30118(c)(1). The manufacturer must provide this notice to NHTSA not more than five working days after a defect in a vehicle has been determined to be safety related. 49 C.F.R.

§ 573.6(b). The manufacturer's notice to NHTSA must be in the form specified by regulation, and is known as a "Part 573 Report." *See* 49 C.F.R. Part 573.

3. A person that violates the notification requirements of the Safety Act or a regulation prescribed thereunder is liable to the United States Government for a civil penalty of not more than \$7,000 for each violation. 49 U.S.C. § 30165(a)(1); 49 C.F.R. § 578.6(a). A separate violation occurs for each motor vehicle and for each failure or refusal to allow or perform a required act. 49 U.S.C. § 30165(a)(1); 49 C.F.R. § 578.6(a). The maximum penalty for a related series of violations is \$35,000,000. 49 U.S.C. § 30165(a)(1).

4. GM is a manufacturer of motor vehicles within the meaning of the Safety Act, *see* 49 U.S.C. § 30102(a)(5), and a person within the meaning of 49 U.S.C. § 30165.

5. On February 7, 2014, GM notified NHTSA that it determined that a defect, which relates to motor vehicle safety, exists in 619,122 model year ("MY") 2005-2007 Chevrolet Cobalt and MY 2007 Pontiac G5 vehicles. According to GM's Part 573 Report, the safety-related defect concerns a condition in which the vehicle's ignition switch may unintentionally move from the "run" position to the "accessory" or "off" position resulting in a loss of power. GM indicated that this risk may be increased if the key ring is carrying added weight or the vehicle goes off road or experiences some other impact related event. GM also indicated that in some cases, the timing of the ignition switch movement relative to the activation of the sensing algorithm of the crash event may result in the airbags not deploying. On February 24, 2014, GM amended its Part 573 Report to include a more detailed chronology of principal events.

6. On February 25, 2014, GM submitted a second Part 573 Report notifying NHTSA that an additional 748,024 vehicles contain the same safety-related defect. Those additional vehicles are the MY 2006-2007 Chevrolet HHR and Pontiac Solstice, MY 2003-2007 Saturn Ion,

and MY 2007 Saturn Sky vehicles. On March 11, 2014, GM amended its February 25, 2014 Part 573 Report to include a more detailed chronology of principal events.

7. On March 28, 2014, GM submitted a third Part 573 Report, indicating that the same safety-related defect exists in service parts that may have been installed during repairs in some MY 2008-2010 Chevrolet Cobalt, MY 2008-2011 Chevrolet HHR, MY 2008-2010 Pontiac Solstice, MY 2008-2010 Pontiac G5, and MY 2008-2010 Saturn Sky vehicles. This Part 573 Report expanded the recall to another 823,788 vehicles.

8. GM is obligated to conduct a recall with regard to the safety-related defect identified in the Part 573 Reports described in Paragraphs 5-7. GM is conducting this recall, which affects a total population of 2,190,934 vehicles in the United States. NHTSA has designated this recall as NHTSA Recall No. 14V-047.

9. On February 26, 2014, NHTSA opened a civil enforcement investigation, Timeliness Query TQ14-001, to evaluate the timing of GM's defect decision-making and reporting of the safety-related defect to NHTSA.

WHEREAS, it is the mutual desire of NHTSA and GM to resolve the Timeliness Query without the need for further action, to avoid the legal expenses and other costs of a protracted dispute and potential litigation;

THEREFORE, based on the agreement of the parties and pursuant to the authority of the Secretary of Transportation to issue orders under the Safety Act, 49 U.S.C. § 30118(e) (as delegated to the NHTSA Administrator, 49 C.F.R. § 1.50), it is ORDERED and AGREED as follows:

## **II. TERMS OF CONSENT ORDER**

10. GM admits that it violated the Safety Act by failing to provide notice to NHTSA of the safety-related defect that is the subject of Recall No. 14V-047 within five working days as required by 49 U.S.C. § 30118(c)(1), 49 U.S.C. § 30119(c)(2), and 49 C.F.R. § 573.6(b).

11. GM shall pay the United States a maximum civil penalty for a related series of violations in the sum of thirty-five million dollars (\$35,000,000) for its failure to provide notice to NHTSA of the safety-related defect that is the subject of Recall No. 14V-047 within five working days. GM shall pay this civil penalty in one lump-sum payment by electronic funds transfer to the U.S. Treasury in accordance with instructions provided by NHTSA, no later than 30 calendar days following execution of this Consent Order.

12. Additionally, GM shall pay a civil penalty in the sum of seven thousand dollars (\$7,000) for each day including April 4, 2014, and each day thereafter up to and including the date on which GM provides the written factual report to NHTSA regarding the investigation conducted by Anton Valukas, as required by Paragraph 15 below, for GM's failure to fully respond to NHTSA's March 4, 2014 Special Order in TQ14-001 by the due date of April 3, 2014. GM shall pay these civil penalties in one lump-sum payment by electronic funds transfer to the U.S. Treasury in accordance with instructions provided by NHTSA, no later than 30 calendar days following the last date on which civil penalties accrue pursuant to this Paragraph. GM shall expeditiously carry out the remedy requirements of the Safety Act relating to Recall No. 14V-047, including by endeavoring to make available the parts necessary to carry out repairs in accordance with the schedule GM provided to NHTSA on April 25, 2014, which is attached hereto as Exhibit A, and is hereby incorporated by reference. In the event that GM learns that the parts availability schedule may be changed by more than five working days from the

schedule provided to NHTSA on April 25, 2014, GM shall notify NHTSA in writing within 24 hours of receiving confirmation of any such change. During the last seven calendar days of GM's parts production, GM shall immediately notify NHTSA of any change that will impact completion of GM's parts production.

13. No later than fifteen calendar days following execution of this Consent Order, GM shall provide a comprehensive written plan to NHTSA of how GM intends to maximize its completion rate for Recall No. 14V-047. The plan shall include, but not be limited to, steps that GM will take to:

- a. reduce the likelihood of slotted keys being reintroduced into the recall population;
- b. encourage owners of recalled vehicles whose native language is not English to obtain a remedy, including through the use of communications in languages other than English;
- c. maintain its website with up-to-date information regarding the recall; and
- d. engage with vehicle owners through new and traditional media, direct contacts with vehicle owners, and other means.

14. In addition to the quarterly reports required by 49 C.F.R. § 573.7, GM shall submit reports regarding Recall No. 14V-047, pursuant to instructions provided by NHTSA, on a biweekly basis for the first six months following execution of this Consent Order and on a monthly basis thereafter for the term of this Consent Order.

15. With respect to the investigation led by Anton Valukas,<sup>1</sup> GM has requested Mr. Valukas prepare a written factual report. GM shall provide a full and complete copy of the report to NHTSA no later than June 30, 2014.

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<sup>1</sup> For purposes of this Consent Order, the investigation conducted by Anton Valukas means the investigation referenced in the testimony of GM's Chief Executive Officer Mary Barra to the United States Congress on April 1 and 2, 2014.

16. GM shall meet with NHTSA no later than 30 calendar days following receipt of the written factual report required by Paragraph 15 to discuss with NHTSA recommendations resulting from the investigation conducted by Anton Valukas and their implementation at GM. GM shall work with NHTSA to evaluate which recommendations are appropriate for implementation and will develop a detailed written plan to implement any recommendations deemed appropriate. GM shall meet with NHTSA on a monthly basis for one year to discuss GM's implementation of any recommendations NHTSA determines are appropriate. GM agrees that, absent compelling circumstances, its Vice President of Global Vehicle Safety (currently Jeff Boyer) will attend the meeting, along with any other GM officials who GM considers appropriate attendees. NHTSA may extend the period of time for monthly meetings pursuant to this Paragraph for up to the term of this Consent Order.

17. GM represents that it has conducted a search of GM locations where documents determined to be responsive to NHTSA's March 4, 2014 Special Order would ordinarily be expected to be found, and will produce the identified documents responsive to the Special Order as of May 23, 2014 with the exception of customer complaint and field report records responsive to Requests Four, Five and Six of the March 4, 2014 Special Order. GM shall fully and substantively respond, including by producing all responsive documents identified through specified custodians and search terms as of May 23, 2014, to each request in the March 4, 2014 Special Order that relates to an actual or potential ongoing safety issue (including the remedy for Recall No. 14V-047) or for which GM has not provided a full and substantive response as of the date of execution of this Consent Order. Specifically, GM shall fully and substantively respond to Requests 2-3, 26-27, 58-59, 77, 95-96, 98, and 106-107. GM shall provide such responses under oath, as required by the Special Order. With respect to Requests 4-6, GM shall produce

the remaining documents determined to be responsive no later than 90 days after execution of this Consent Order. GM shall produce the documents responsive to Requests 4-6 in their original, unaltered form consistent with the format requirements specified by the Special Order. Additionally, GM shall produce the documents responsive to Requests 4-6 in pdf or tiff format with all personally identifiable information (PII) redacted. GM shall provide an index to the remaining documents responsive to Requests 4-6 which shall include the name of the person making the complaint or report, the name of the driver(s) of the vehicle(s) involved in any accident or incident, the date of the accident or incident, and the model and model year of the GM vehicle involved in the accident or incident.

18. GM shall fully and substantively respond, including by producing all responsive documents, to NHTSA's April 4, 2014 Special Order concerning GM's testing of the efficacy of removing all items from a vehicle's key ring, leaving only the vehicle key, to prevent inadvertent movement of the ignition switch in any of the vehicles within the recall population for Recall No. 14V-047.

19. GM has established a process for its employees to report expeditiously concerns regarding actual or potential safety-related defects<sup>2</sup> or actual or potential noncompliance with Federal Motor Vehicle Safety Standards. GM shall continue to review and strengthen this reporting process, and rigorously enforce its non-retaliation policy for employees who report concerns regarding actual or potential safety-related defects or potential noncompliance with Federal Motor Vehicle Safety Standards. No later than three months following execution of this

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<sup>2</sup> For purposes of this Consent Order, "safety" refers to the performance of a motor vehicle or motor vehicle equipment in a way that protects the public against unreasonable risk of accidents occurring because of the design, construction, or performance of a motor vehicle, and against unreasonable risk of death or injury in an accident, and includes nonoperational safety of a motor vehicle. 49 U.S.C. § 30102(a)(8).

Consent Order, GM shall provide NHTSA with written documentation describing the process and policy described in this Paragraph.

20. GM has initiated efforts to improve employee training regarding proper documentation practices and to encourage discussion of safety issues, including discussion of defects and safety consequences of defects. Such training will expressly disavow statements diluting the safety message in the nature of certain statements in pages 33-44 of the attached Exhibit B.

21. GM shall improve and implement company processes for the purpose of identifying and reporting safety-related defects more quickly. Such process improvements shall include, but not be limited to changes for the purpose of:

- a. improving GM's ability to analyze data to identify potential safety-related defects;
- b. encouraging and improving information-sharing across functional areas and disciplines;
- c. increasing the speed with which recall decisions are made (including by clarifying the recall decision-making process to decrease the number of steps prior to making the final decision of whether to conduct a recall); and
- d. improving communication with NHTSA regarding actual or potential safety-related defects.

GM shall discuss its proposed changes and the implementation of such changes with NHTSA throughout the process of identifying and implementing process improvements. No later than 120 calendar days following execution of this Consent Order, GM shall submit a letter to NHTSA outlining the process improvements it has made pursuant to the requirements of this Paragraph. GM shall promptly respond to any feedback from NHTSA concerning GM's organizational restructuring pursuant to this Paragraph, including by making additional changes to its organizational structure to address NHTSA's feedback.



22. GM shall revise its product quality analytics to improve its ability to identify safety consequences and the severity of those consequences, as well as to assess the number or rate of allegations, complaints, incidents, reports and/or warranty claims relating to potential safety-related defects. GM shall discuss its proposed revisions and the implementation of such revisions with NHTSA throughout the process of revising its product quality analytics. No later than 120 calendar days following execution of this Consent Order, GM shall submit a letter to NHTSA outlining the revisions it has made to its product quality analytics pursuant to the requirements of this Paragraph.

23. GM shall meet with NHTSA no later than 120 calendar days after execution of this Consent Order to conduct simulations—i.e., an exercise to discuss hypothetical scenarios, for the purpose of assessing the effectiveness of the improvements resulting from Paragraphs 21-22—and to discuss and identify further needed improvements. GM agrees that, absent compelling circumstances, its Vice President of Global Vehicle Safety (currently Jeff Boyer) will attend the meeting, along with any other GM officials whom GM considers appropriate attendees. GM shall promptly respond to any feedback from NHTSA following this meeting, including by making additional improvements under Paragraphs 21-22 to address NHTSA's feedback. To the extent that such additional improvements are warranted and at NHTSA's request, GM shall conduct additional simulations no later than 30 days following NHTSA's request.

24. GM shall not delay holding any meeting—including any meeting of GM's Executive Field Action Decision Committee (EFADC), Field Performance Evaluation Recommendation Committee (FPERC), or other body charged with the responsibility of determining the existence of a safety-related defect—to decide whether or not to recommend or

conduct a safety recall because GM has not yet identified the precise cause of a defect, a remedy for the defect, or prepared a plan for remedying the defect. GM shall ensure that any committee or individual responsible for decision-making on safety recalls is informed of safety-related concerns in a reasonably expeditious manner, including by ensuring that GM's corporate structure enables its safety organization to promptly bring safety-related issues to the attention of committees and individuals with authority to make safety recall decisions.

25. GM shall meet with NHTSA on a monthly basis for one year following the execution of this Consent Order to report, in the manner specified by NHTSA, on new technical service bulletins (TSBs) or other dealer communications, GM's decision-making associated with safety-related or high-frequency warranty claims or safety-related field reports, and any other actual or potential safety-related defect issues. NHTSA may extend the period of time for monthly meetings pursuant to this Paragraph for up to the term of this Consent Order.

26. On a monthly basis for a period of one year, GM shall provide NHTSA with a written list of every safety-related issue concerning vehicles already in the fleet that is under consideration by any GM Product Investigator or otherwise under consideration by GM's Global Vehicle Safety organization. For each safety-related issue, the list shall include the model and model year vehicles affected or potentially affected and a description of the safety-related issue. Such reporting obligations will extend only to: (a) vehicles within GM's United States fleet; (b) other vehicles that are substantially similar to vehicles within GM's United States fleet; and (c) other vehicles that share common parts with vehicles within GM's United States fleet.

27. No later than 30 calendar days following execution of this Consent Order, GM shall provide NHTSA with a comprehensive written plan regarding implementation of the performance obligations required by this Consent Order.

28. GM shall meet with NHTSA on a quarterly basis to discuss implementation of the performance obligations required by this Consent Order and GM shall address promptly all concerns raised by NHTSA in those meetings. GM agrees that, absent compelling circumstances, its Vice President of Global Vehicle Safety (currently Jeff Boyer), Director of Field Product Investigations and Evaluations (currently Brian Latouf), and Global Public Policy Director (currently Steve Gehring) will attend the quarterly meetings, along with any other GM officials who GM considers appropriate attendees.

29. NHTSA may consider remedial actions GM has taken prior to the execution of this Consent Order in determining whether GM has carried out the performance requirements of this Consent Order.

30. GM agrees to use best efforts to cooperate with NHTSA in carrying out the requirements of this Consent Order by, among other things, (i) GM's Global Vehicle Safety organization providing prompt notice to NHTSA in the event any requirement of this Consent Order cannot be met or timely met, and (ii) ensuring employees involved with implementation of the performance requirements of this Consent Order are kept well-informed about developments and are allocated sufficient time during their working hours to prepare reports and to prepare for meetings with NHTSA.

31. GM shall provide written notice of each required submission under this Consent Order by electronic mail to NHTSA's Director, Office of Defects Investigation (currently Frank Borris, Frank.Borris@dot.gov), and with a copy to NHTSA's Chief Counsel (currently O. Kevin Vincent, Kevin.Vincent@dot.gov).

### **III. TERM OF CONSENT ORDER**

32. Unless otherwise specified, the term of GM's performance obligations under this Consent Order is three years, provided, however, that the commitments in Paragraphs 19, 20 and 24 shall survive the term of this Consent Order.

### **IV. AMENDMENT**

33. This Consent Order cannot be modified, amended or waived except by an instrument in writing signed by all parties, and no provision may be modified, amended or waived other than by a writing setting forth such modification, amendment or waiver and signed by the party making the modification, amendment or waiver.

### **V. INTERPRETATION CONSISTENT WITH FEDERAL LAW**

34. Nothing in this Consent Order shall be interpreted or construed in a manner inconsistent with, or contravening, any Federal law, rule, or regulation at the time of the execution of this Consent Order, or as amended thereafter.

### **VI. FULL AND AUTHORIZED SETTLEMENT**

35. Upon receipt of the payment set forth in Paragraph 11 above, the Secretary of Transportation, by and through the Administrator of NHTSA, releases GM, including its current and former directors, officers, employees, agents, parents, subsidiaries, affiliates, successors, and assigns from liability for civil penalties pursuant to 49 U.S.C. § 30165 in connection with the untimeliness of Recall No. 14V-047.

36. Upon receipt of the payment set forth in Paragraph 12 above, the Secretary of Transportation, by and through the Administrator of NHTSA, releases GM, including its current and former directors, officers, employees, agents, parents, subsidiaries, affiliates, successors, and

assigns from liability for civil penalties pursuant to 49 U.S.C. § 30165 in connection with the untimeliness of GM's response to NHTSA's March 4, 2014 Special Order.

37. This Consent Order does not release GM from civil or criminal liabilities, if any, that may be asserted by the United States, the Department of Transportation, NHTSA, or any other governmental entity, other than its civil penalty liability under 49 U.S.C. § 30165 as described in Paragraphs 35-36, above.

38. The parties shall each bear their own respective attorneys' fees, costs, and expenses.

39. This Consent Order shall be effective following the execution of this Consent Order. Any breach of the obligations under this Consent Order shall be immediately enforceable in any United States District Court. GM agrees that it will not raise any objection as to venue.

40. This Consent Order constitutes the entire agreement regarding the resolution of the subject matter therein, and supersedes any and all prior or contemporaneous written or oral agreements or representations.

41. The parties who are the signatories to this Consent Order have the legal authority to enter into this Consent Order, and each party has authorized its undersigned to execute this Consent Order on its behalf.

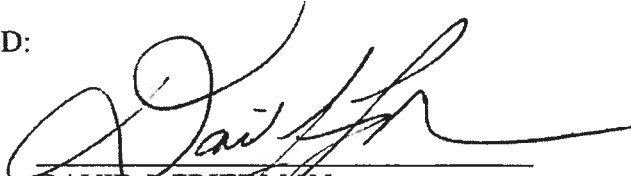
42. This Consent Order shall be binding upon, and inure to the benefit of, GM and its current and former directors, officers, employees, agents, parents, subsidiaries, affiliates, successors, and assigns.

43. This Consent Order shall not be construed to create rights in, or grant any cause of action to, any third party not party to this Consent Order.

[SIGNATURE PAGES FOLLOW]

APPROVED AND SO ORDERED:

Dated: May 16, 2014

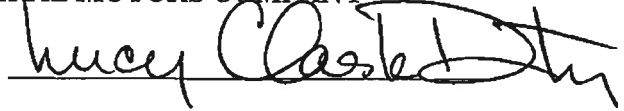
  
\_\_\_\_\_  
DAVID J. FRIEDMAN  
Acting Administrator

AGREED:

Dated: May 16, 2014

GENERAL MOTORS COMPANY

By:

A handwritten signature in black ink, appearing to read "Lucy Clark Dougherty", written over a horizontal line.

Lucy Clark Dougherty  
Vice President & General Counsel  
General Motors North America,  
Chief Legal Advisor for Global Vehicle Safety

AGREED:

NATIONAL HIGHWAY TRAFFIC SAFETY  
ADMINISTRATION,  
U.S. DEPARTMENT OF TRANSPORTATION

Dated: May 16, 2014

By: O. Kevin Vincent

O. Kevin Vincent  
Chief Counsel

Dated: May 16, 2014

By: T. H. Goodman

Timothy H. Goodman  
Acting Assistant Chief Counsel  
for Litigation & Enforcement

Dated: May 16, 2014

By: Kerry E. Kolodziej

Kerry E. Kolodziej  
Senior Trial Attorney



**UNITED STATES DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

1200 New Jersey Avenue SE  
Washington, DC 20590

**In re:**

TQ14-001

NHTSA Recall No. 14V-047

**CONSENT ORDER**

EXHIBIT A

## TOTAL US SERVICE PART AND KIT AVAILABILITY

| Calendar Weeks | Date Range        | Ignition Switches | Ignition Cylinders | Key Sets         | Service Kits     |
|----------------|-------------------|-------------------|--------------------|------------------|------------------|
| 15 – 18        | April 6 – May 3   | 80,920            | 107,100            | 78,980           | 78,980           |
| 19 – 22        | May 4 – May 31    | 227,860           | 131,750            | 231,650          | 167,590          |
| 23 – 26        | June 1 – June 28  | 266,660           | 280,500            | 390,350          | 316,490          |
| 27 – 30        | June 29 – July 26 | 400,010           | 365,500            | 497,230          | 412,390          |
| 31 – 34        | July 27 – Aug 23  | 529,440           | 450,500            | 497,230          | 521,090          |
| 35 – 39        | Aug 24 – Sep 27   | 705,920           | 563,120            | 621,540          | 635,370          |
| 40             | Sep 28 – Oct 4    | 141,180           | 112,620            | 124,300          | 127,070          |
| <b>TOTAL</b>   |                   | <b>2,351,990</b>  | <b>2,011,090</b>   | <b>2,441,280</b> | <b>2,258,980</b> |

Kit volumes reflect kits produced within specified date range, not cumulative amounts.

Kits are available for shipment to dealers generally within two days of receipt by GM.

Kits for 2008-2011 vehicle population become available week 20.

A service kit can consist of an ignition switch, ignition cylinder and key set or an ignition switch and key set only.

**UNITED STATES DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**

1200 New Jersey Avenue SE  
Washington, DC 20590

**In re:**

TQ14-001

NHTSA Recall No. 14V-047

**CONSENT ORDER**

EXHIBIT B

2008 Q1 Interior  
Technical Learning Symposium  
**Soft Trim Breakout Session**

Meet-Me Line Participants:

Please mute your phones when you are not  
speaking.

If your phone does not have a mute function, you  
can do this by hitting:

- \* 6 on your phone to mute,
- \* 7 to un-mute.

*Thank you!*

*Please Remember to Sign-In*

**Interior Technical Learning Symposium**

**Breakout Session**

January 31, 2008

| <b>Last Name, First Name<br/>(Please Print)</b> | <b>GMID</b> | <b>Directors Last Name<br/>(Please Print)</b> |
|-------------------------------------------------|-------------|-----------------------------------------------|
|                                                 |             |                                               |
|                                                 |             |                                               |
|                                                 |             |                                               |
|                                                 |             |                                               |
|                                                 |             |                                               |

*Those on phone in rooms with more than  
one person, please pass around sign-in  
sheet and e-mail to Breakout Session  
facilitator*

*Your feedback is important. Please  
complete a survey prior to leaving.*

*Please ask all questions loudly, clearly,  
slowly, and into the phone or microphone,  
in order to be heard and recorded.*

**Please Start WebEx  
Recording Now**



# **2008 Q1 Interior Technical Learning Symposium**

## **Soft Trim Breakout Session**

## **Technical reasons for Recalls**

- Designs not compliant with regulatory requirements
- Water Contamination of Electrical, Fuel Components and Connectors
- Corrosion
- Overheating or Near Thermal Event
- Chafing contact of hoses, wires, and other objects

## **Reasons for Recalls**

### *Recurring Themes*

- **Validation Not Fully Representative**
  - Changes made after validation
  - Late changes driven by market need
  - Prototype vs production tooled parts
  - Incomplete or incorrect VTS/CTS requirements
- **Not recognizing buds of problems**
- **Incomplete follow through on identified issues**
- **Not obtaining input from all stakeholders on changes**
  - EWO Co-Authors
- **Lack of awareness of FMVSS Regulations**

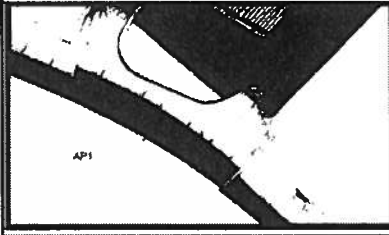
## **Reason for this Training Responsibility**

- A key responsibility of the Designing Engineer is to validate the design within the production process, and to maintain validation of the design
- The designing engineer must know the performance and compliance requirements for their part and system

## Case Studies: Incomplete Validation

### Headliner Trim

**Condition:** Certain vehicles have headliner trim that may not have sufficient energy absorption capability at the NHTSA AP1 target point.



**Field Action:** Install an additional piece of energy absorbing material to the headliner at the AP1 target point



GM CONFIDENTIAL

**Model Year(S)**  
2007

**Model(S)**  
Chevrolet Equinox  
Pontiac Torrent

**Field Action Category**  
Noncompliance

**Population Affected**  
67,000 Vehicles

**Estimated Cost** \$2.0M

### **Systemic Root Causes**

- Prior to March 1, 2007 Standard Work Templates were not created and performance/design reviews were not instituted regularly in this area. This, along with multiple manager changes (4 in a 4 year period), resulted in inadequate mentoring of employees. Lack of standard work templates combined with transitions in staffing contributed to inadequate validation.

## **Preventive Actions**

- Previously the FMVSS201U Performance Engineer would choose a single normal condition as a worst case for analysis and testing. Effective 1 Oct 07, new analysis and development requirements have been developed which will result in more assessments for the allowable range of conditions. All new programs will assess these conditions at the minimum and maximum horizontal angles and at 10 degree increments in between.
- The validation requirements have also been revised with increased margin and variation criterion. One test acceptance criteria has been lowered to 680 from 867 HIC (d). Two or more tests acceptance criteria, has been lowered to 820 from 921 HIC (d) with a standard deviation criteria (60) added. Additional margin is needed to compensate for degree of difficulty in managing the infinite number of conditions that cannot all be assessed. The additional margin is also needed due to the large test-to-test variation that exists with FMVSS201U.

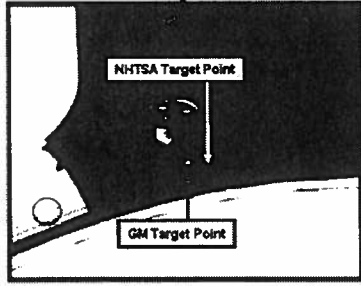


## **Preventive Actions**

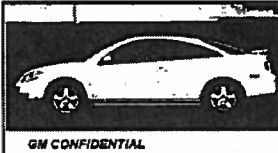
- Standard work templates have been created and performance/design reviews have been instituted. This format will assure all points are considered and reviewed relative to: execution of Best Practices, coarse-to-fine analysis, and physical test. Learnings from performance reviews will be reviewed in the Closed Loop Learning Process to ensure all planned actions are implemented, Best Practices are updated and/or generated, and learnings are cascaded throughout the organization.
- A Design of Experiments is being conducted to more completely understand test variability due to test set up, facility differences (including facilities utilized by the NHTSA), and vehicle and part variation. Outcomes from this study will allow us to better develop our products with further understanding of variation, help refine our validation criteria, and will be managed as a Corporate Managed Solution by a BOM Family Owner.

## Headliner Trim

**Condition:** Some vehicles have headliner trim that may not have sufficient energy absorption capability at the NHTSA AP1 Target Point.



**Effect of the Condition:** Vehicles in this condition may not meet the Federal Motor Vehicle Safety Standard (FMVSS) 201 (Occupant Protection in Interior Impact) requirement for the AP1 target point.

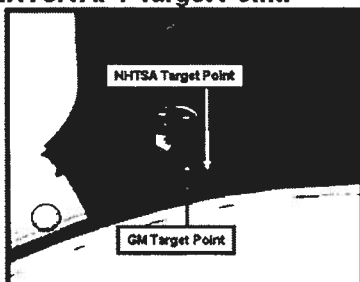


**Model Year(S)**  
2002 - 2006

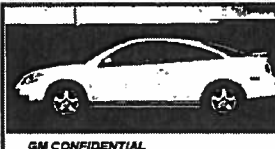
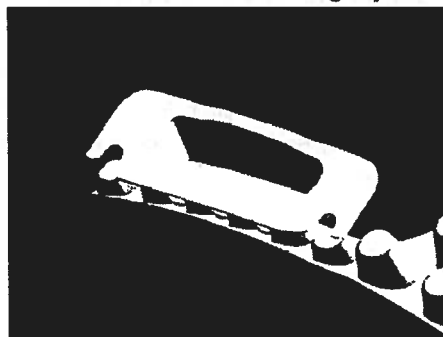
**Model(S)**  
Chevrolet Cobalt  
Coupes

### Headliner Trim

**Condition:** Some vehicles have headliner trim that may not have sufficient energy absorption capability at the NHTSA AP1 Target Point.



**Field Action:** Install an additional piece of energy absorbing material to the headliner at the AP1 target point



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**Model Year(S)**  
2002 - 2006

**Model(S)**  
Chevrolet Cobalt  
Coupes

**Field Action Category**  
Noncompliance

**Population Affected**  
122K Vehicles

**Estimated Cost** \$8.9M

## **Systemic Root Causes**

- Prior to March 1, 2007 Standard Work Templates were not created and performance/design reviews were not instituted regularly in this area. This, along with multiple manager changes (4 in a 4 year period), resulted in inadequate mentoring of employees. Lack of standard work templates combined with transitions in staffing contributed to inadequate validation.

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## **Preventive Actions**

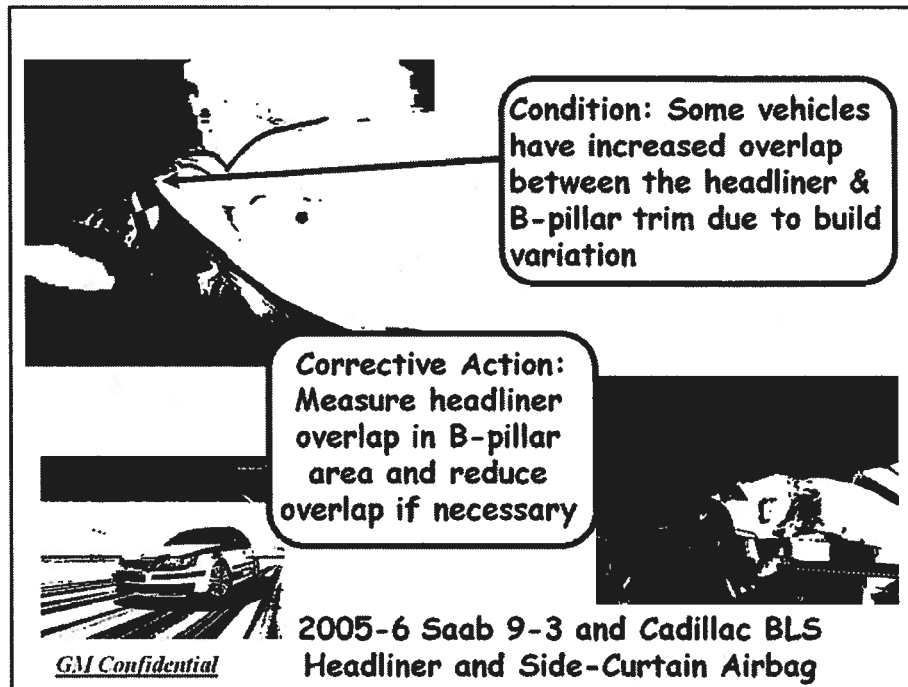
- The validation requirements have been revised with increased margin and variation criteria. One test acceptance criteria has been lowered to 680 from 867 HIC (d). Two or more tests acceptance criteria, has been lowered to 820 from 921 HIC (d) with a standard deviation criteria (60) added.
- Standard work templates have been created and performance/design reviews have been instituted. This format will assure all points are considered and reviewed relative to: execution of Best Practices, course-to-fine analysis, and physical test. Learnings from performance reviews will be reviewed in the Closed Loop Learning Process to ensure all planned actions are implemented, Best Practices are updated and/or generated, and learnings are cascaded throughout the organization.

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## **Preventive Actions**

- A Design of Experiments is being created to more completely understand test variability due to test set up, facility differences (including facilities utilized by the NHTSA), and vehicle and part variation. Outcomes from this study will allow us to better develop our products with further understanding of variation, help refine our validation criteria, and will be managed as a Corporate Managed Solution by a 80M Family Owner.

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Graphic slide showing photos with explanation of issue. Green Box: Possible field fix Red Box: condition

### *Effect on Vehicle Performance*

- The RRABs may not deploy to fully cover the B-pillar area.
  - In revised FMVSS 214 testing, HIC results were 110 at 15 ms and 131 at 36 ms.
  - In identical tests with trim within specifications, the results were 67-181 at 15 ms and 87-194 at 36 ms. Concluded that all legal requirements are met and all IARVs are within internal targets.
- Interaction between RRABs and interior components has been observed in competitive vehicle testing and has not been completely avoidable given the current complexity of vehicle design and manufacturing and the narrow time and space constraints for RRAB operation.



## HIC Values obtained when there is Airbag and B-pillar Interaction

- SAAB 9-3
  - Revised FMVSS 214 (15 ms)      105-110
  - Revised FMVSS 214 (36 ms)      131-132
- Malibu
 

|             | Front Seat | Rear Seat |
|-------------|------------|-----------|
| – Side NCAP | 394        | 295       |
| – IIHS test | 292        |           |
- Cobalt
 

|                                      |     |     |
|--------------------------------------|-----|-----|
| – Side NCAP <small>(G601010)</small> | 339 | 504 |
| – Side NCAP <small>(C15950)</small>  | 220 | 350 |

### **Systemic Root Cause**

- WAS A BEST PRACTICE NOT FOLLOWED BY SAAB?
  - GM ALSO SAW THE SAME ISSUE ON A MALIBU & COBALT

### **Preventive Actions**

- WAS A BEST PRACTICE ESTABLISHED?

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**Case Study:  
Incorrect SSTS/CTS**

### Accelerator Pedal Potential Restriction

**Condition:** Driver's floor mat at SOP with hook retainer could restrict accelerator pedal (4 CTF complaints). Change to pin retainer at SORP could restrict pedal if mat not on pin.



**Effect of the Condition:** The accelerator pedal may not return to idle when the driver removes his/her foot.



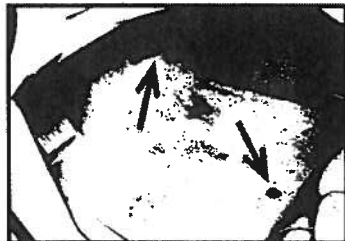
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**Model Year(S)**  
2008

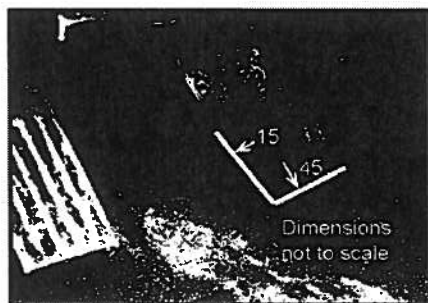
**Model(S)**  
GMC Savana  
Chevrolet Express

### Accelerator Pedal Potential Restriction

**Condition:** Driver's floor mat at SOP with hook retainer could restrict accel pedal movement (4 CTF complaints). Change to pin retainer at SORP could restrict pedal if mat not on pin.



**Field Action:** None. In production, cut-out revised & formed edge eliminated



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**Model Year(S)**  
2007

**Model(S)**  
Saturn Outlook  
GMC Acadia

**Field Action Category**  
None

## **Systemic Root Causes**

- The subject vehicles were produced with driver floor mats that do not meet the best practice (#110966 – published 1/19/06).

... it is acceptable to eliminate the portion of the mat under the accelerator. If the mat is not to be extended under the accelerator then clearance of at least 27mm to the entire perimeter of the accelerator is required.

Regarding attachment....Less robust is for a single attachment on the outboard rear of both mats (Outlook & Acadia have their retainer at the center of the mat).

## **Preventive Actions**

- Use established best practices

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### *Additional Information*

Throttle Pedal Restriction Test (GMN0416) only requires testing of the driver floor mat in design position if the mat has at least one mechanical attachment.

## 1. Additional Case Study



### VIN Plate Error on Incomplete Vehicles

**Condition:** Some incomplete 2008 G-Vans were built with an incorrect GVWR digit (position 4) in the vehicle identification number (VIN). These vans are rated at 10,000 lb. The GVWR should have had the letter 'H' (GVWR 9,001 - 10,000 lb). The vehicles were produced with the character 'J' (GVWR 10,001 - 14,000 lb).

**Effect of the Condition:** The customer may have difficulty getting the vehicle licensed/registered because of the VIN does not match published VIN designation documents/cards. Licensing/registration bureaus may request a higher fee because the VIN indicates the vehicle has a higher GVWR rating than it should.



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**Model Year(S)**  
2008

**Model(S)**  
GMC Savana  
Chevrolet Express

### VIN Plate Error on Incomplete Vehicles

**Condition:** Some incomplete 2008 G-Vans were built with an incorrect GVWR digit (position 4) in the vehicle identification number (VIN). These vans are rated at 10,000 lb. The GVWR should have had the letter 'H' (GVWR 9,001 - 10,000 lb). The vehicles were produced with the character 'J' (GVWR 10,001 - 14,000 lb).

**Field Action:** A letter is being sent to customers informing them of error and to use the letter for registering/licensing the vehicle if required. A letter is also being provided to the National Insurance Crime Bureau by the Safety Regulations and Consumer Information team identifying the VIN anomaly for the suspect vehicles



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**Model Year(S)**  
2008

**Model(S)**  
GMC Savana  
Chevrolet Express

**Field Action Category**  
Customer Satisfaction

**Population Affected**  
992

**Estimated Cost** \$992

### **Systemic Root Causes**

- There is no cross check to confirm the data table is populated correctly.

### **Preventive Actions**

- The process will be revised to conduct peer reviews of the Oracle Configurator tables anytime the data tables are modified. The peer review will be signed off by both the engineer who loaded the table and the engineer's back-up.

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# Documentation Guidelines



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## Documentation Guidelines

In a corporation the size of GM, writing is in many cases the only way to communicate globally because of time changes, number of people involved, etc.

- Write "smart."
  - Be factual, not fantastic, in your writing.
- When identifying product risks, make sure they are addressed and closed out.
- Our writing must always be based only on fact, without judgmental adjectives and speculation.



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## Documentation Guidelines

- Understand that there really aren't any secrets in this company.
  - For anything you say or do, ask yourself how you would react if it was reported in a major newspaper or on television.
- Don't be cute or clever.
  - The words you choose could be taken out of context to suggest you meant something much worse than what was intended.
  - This may be especially easy to do in an e-mail, when there might be a temptation to use a casual tone to describe a potentially serious safety risk.



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The Brutal Facts. The topic today is very much a current event. This year, a week has not passed without headlines involving subjects like: Recalls and NHTSA investigations.

## State only the Facts – actual examples

At trial, lawyers for Mraz introduced a 1999 memo written by Antonius Brenders, a senior manager in DaimlerChrysler's Vehicle Safety Office that detailed the pros and cons of doing a survey that the National Highway Transportation Safety Agency sought to determine the cause of the park-to-reverse incidents.

**One "significant risk" to doing the survey was it could provide "product liability credence to a hypothesis we have long ignored."**

**"It is recommended that a campaign be issued to fix the painted handle vehicles manufactured during 1996-2000 (MY 97-00)."**

- March 6, 2000, memo by Ford engineer Bharat Malhotra



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## **What every company vehicle driver must know...**

- Comments in the Safety related section of the CVEP survey:
  - A study of 10 weeks worth of CVEP safety related verbatims yielded 34% that contained inappropriate language (subjective comments, opinions, etc.)
  - The balance of the comments (66%) contained information that could be helpful to a problem solver



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## What every company vehicle driver must know...

Examples of comments that do not help identify and solve problems:

- "This is a lawsuit waiting to happen..."
- "Unbelievable Engineering screw up..."
- "This is a safety and security issue..."
- "This is a very dangerous thing to happen. My family refuses to ride in the vehicle now..."
- "Scary for the customer..."
- "Kids and wife panicking over the situation..."
- "I believe the wheels are too soft and weak and could cause a serious problem..."
- "Dangerous...almost caused accident"

Examples of comments that can help identify and solve problems:

- "Windshield wipers did not work properly. Would run for 3-4 seconds and then quit for the next 7-8 minutes...repeatedly"
- "Upon opening the passenger side rear door after a day of rain followed by freezing temperatures, the passenger side rear door would not close. The door had to be slammed shut several times before it would latch closed."
- "Vehicle traction control activates under normal acceleration from a stop...activation occurs without warning and in conditions not generally associated with the need for traction control."



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## Judgment Words

Documents used for reports and presentations should contain only engineering results, facts, and judgments. These documents should not contain speculations, opinions, vague non descriptive words, or words with emotional connotations. Some examples of words or phrases that are to be avoided are:

|                        |               |                         |                                            |
|------------------------|---------------|-------------------------|--------------------------------------------|
| always                 | deathtrap     | gruesome                | rolling sarcophagus (tomb or coffin)       |
| annihilate             | debilitating  | Hindenburg              | safety                                     |
| apocalyptic            | decapitating  | Hobbling                | safety related                             |
| asphyxiating           | defect        | Horrific                | serious                                    |
| bad                    | defective     | impaling                | spontaneous combustion                     |
| Band-Aid               | detonate      | inferno                 | startling                                  |
| big time               | disemboweling | Kevorkianesque          | suffocating                                |
| brakes like an "X" car | enfeebling    | lacerating              | suicidal                                   |
| cataclysmic            | evil          | life-threatening        | terrifying                                 |
| catastrophic           | eviscerated   | maiming                 | Titanic                                    |
| Challenger             | explode       | malicious               | tomblike                                   |
| chaotic                | failed        | mangling                | unstable                                   |
| Cobain                 | failure       | maniacal                | widow-maker                                |
| condemns               | flawed        | mutilating              | words or phrases with biblical connotation |
| Corvair-like           | genocide      | never                   | you're toast                               |
| crippling              | ghastly       | potentially-disfiguring |                                            |
| critical               | grenadelike   | powder keg              |                                            |
| dangerous              | grisly        | problem                 |                                            |



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| <b>Instead of</b> | <b>Use</b>                                                                                                                   |
|-------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Problem</b>    | = Issue, Condition, Matter                                                                                                   |
| <b>Safety</b>     | = Has Potential Safety Implications                                                                                          |
| <b>Failed</b>     | = Broke & separated 10mm.<br>Visible crack 25mm long.<br>Ignited, flame grew to 100mm in 15 sec.,<br>then self extinguished. |
| <b>Good Bad</b>   | = Above/Below/Exceeds<br>Specification.                                                                                      |
| <b>Defect</b>     | = Does not perform to design                                                                                                 |
| <b>Defective</b>  |                                                                                                                              |



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Available on Product  
Investigations website at:  
<http://vsi.gm.com/pi>

## DOCUMENTATION GUIDELINES

### BE ACCURATE

The accurate documentation and transfer of information, both favorable and unfavorable from a product performance standpoint, is essential to efficient, effective attainment of better, safer products. Make sure the information you document, place in your files, or transfer is accurate.

### CLOSE THE LOOP EFFECTIVELY

Ask thoughtful questions. Intelligent questioning is at the heart of GM's efforts to build better, safer products. Don't let something go by if you have a concern. Just be sure that your questions are answered, and that the answers are documented.

If a document is found to be inaccurate or potentially misleading after distribution, it should be clarified or supplemented in writing so that the inaccurate or misleading impression is corrected.

### BE FACTUAL

Report the facts and let the facts speak for themselves. Avoid needless guesswork or speculation, unsubstantiated opinions, editorial and gratuitous comments, and unnecessary elaboration in describing consequences of risks.

Exercise care in using terms which are judgmental. Words such as "Problem," "success," or "Failure," without detailed facts, can lead to improper conclusions. Examples of words that identify without adding unnecessary judgment are:

- Conditions, reason, matter, incident, event.

### BE INFORMATIVE

Provide complete information. Missing or incomplete information can lead to confusion and delay.



### BE OBJECTIVE

Provide information in objective terms. Use quantitative measurements when possible, rather than qualitative conclusions.

Examples of quantitative communications are:

- Check valve on long
- Corroded to a depth of 0.1 x 1 mm
- Shipping distance increased by 22.5 mi

Examples of words that may convey qualitative conclusions are:

- Good, bad, outstanding, disastrous, catastrophic.

### AVOID AMBIGUITY

Certain words and expressions can be ambiguous. The phrase "Trouble just found" does not necessarily mean that there was no trouble. It could be interpreted to mean that there was trouble, but that the investigation could not find it. The term "Defect" can also be ambiguous. In certain contexts, "Defect" is a legal "term of art", and can be regarded as a legal admission.

### AVOID VAGUE GENERALIZATIONS

Avoid vague generalizations and imprecise characterizations or statements for detailed facts.

### CONSIDER HOW DOCUMENTS WILL BE INTERPRETED BY PEOPLE OUTSIDE OF GM

There is nothing that you write or hard copy or in electronic form that cannot be obtained by third parties. This is why an incomplete document can be misinterpreted, especially by people outside of GM.

### USE COMMON SENSE AND GOOD JUDGMENT

This is the bottom line!

GM

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## **What is proper documentation?**

**Do**                    **be accurate**  
                         **be factual**  
                         **be objective**  
                         **close the loop**

**Don't**                **generalize**  
                         **embellish**  
                         **be ambiguous**



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**Interior Technical Learning Symposium**

**Breakout Session**

January 31, 2008

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complete a survey prior to leaving.*



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*Thanks for  
participating!!!*



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