



May 25, 2012

Mr. D. Scott Yon, Chief
Vehicle Integrity Division, NVS-214
U.S. Department of Transportation

National Highway Traffic Safety Administration (NHTSA)
Office of Defects Investigation (ODI)
Room W48-304
1200 New Jersey Avenue SE
Washington, D.C. 20590

Reference: NVS-212am; EA11-010

Dear Mr. Yon:

Attached is Chrysler Group LLC's ("Chrysler") supplemental response to Questions 16 and 23 of the referenced inquiry. By providing the information contained herein, Chrysler is not waiving its claim to attorney work product and attorney-client privileged communications.

Sincerely,

A handwritten signature in black ink, appearing to read "David D. Dillon".

David D. Dillon

Attachment and Enclosures

Preliminary Statement

On April 30, 2009 Chrysler LLC, the entity that manufactured and sold the vehicles that are the subject of this Information Request, filed a voluntary petition for relief under Chapter 11 of Title 11 of the United States Bankruptcy Code.

On June 10, 2009, Chrysler LLC sold substantially all of its assets to a newly formed company now known as Chrysler Group LLC. Pursuant to the sales transaction, Chrysler Group LLC assumed responsibility for safety recalls pursuant to the 49 U.S.C. Chapter 301 for vehicles that were manufactured and sold by Chrysler LLC prior to the June 10, 2009 asset sale.

On June 11, 2009, Chrysler LLC changed its name to Old Carco LLC. The assets of Old Carco LLC that were not purchased by Chrysler Group LLC, as well as the liabilities of Old Carco that were not assumed, remain under the jurisdiction of the United States Bankruptcy Court – Southern District of New York (*In re Old Carco LLC, et al.*, Case No. 09-50002).

Note: Unless indicated otherwise in the response to a question, this document contains information through December 27, 2011, the date the information request was received.

Please repeat the applicable request verbatim above each response. After Chrysler's response to each request, identify the source of the information and indicate the last date the information was gathered.

16. Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, the Alleged Defect in the subject vehicles that have been conducted, are being conducted, are planned, or are being planned by, or for, Chrysler. Ensure that this response includes testing or analysis conducted either by Chrysler or its suppliers, on any and all headlamp switches returned to Chrysler or the supplier, from field service or other consumer use. For each such action, provide the following information:

- a. Action title or identifier;
- b. The actual or planned start date;
- c. The actual or expected end date;
- d. Brief summary of the subject and objective of the action;
- e. Engineering group(s)/supplier(s) responsible for designing and for conducting the action; and
- f. A brief summary of the findings and/or conclusions resulting from the action.

For each action identified, provide copies of all documents related to the action, regardless of whether the documents are in interim, draft, or final form. Organize the documents chronologically by action.

A16. The requested assessments are listed below and for each assessment the appropriate enclosures are referenced as applicable.

Assessment 5: Customer Survey - Supplemental Response

Survey Summary: Chrysler completed a survey of 2005 model year Suspect Population Minivan owners who reported incidents of flicker and/or dim.

These Minivan owners had (1) a vehicle in service for a minimum of 48 months, (2) a vehicle manufactured within the 21 month Suspect Population, and (3) registered a complaint of flicker and/or dim.

A total of 70 reported complaints were identified, through CAIR and/or Field Reports, to be associated with the Alleged Defects of flicker and/or dim. Of the 70 reported complaints, the Chrysler Customer Assistance Center was able to contact 39 customers, of which 18 completed the survey, providing the basis for this assessment.

- Of the 18, 15 were found to be related to flicker and/or dim.
- 6 of the 15 complaints (40%) that were initially received as flicker were confirmed as a dimming condition.

- The remaining 9 reports confirmed a flicker¹ condition.
- None of the confirmed flicker conditions were found to be related to the headlamp switch.

The customer survey results are included in Enclosure 11 – Assessment 5 Customer Survey Results Conf Bus Info.

In summary, analysis of the customer survey results demonstrates that, although the allegations of flicker and dim are distinct and technically different conditions, they are often grouped together, as customers use these terms interchangeably. The results also demonstrate that the headlamp switch does not surface as cause in any of the flicker CAIR or Field Reports.

¹ NHTSA has long recognized the condition of flicker as a momentary loss of illumination (less than one second).

Assessment 6: Flicker and Dim Complaint Analysis - Supplemental Response

Chrysler recorded video of 2005 model year Minivans where the owners reported incidents of flicker. Both vehicles have been in service for over 48 months and were manufactured within the 21 month Suspect Population.

| 2005 RS MINIVAN | | | | |
|-----------------|-------------------------------------|--|-------------------------------------|----------------------------|
| Vehicle # 5R382 | | | Vehicle # 5R474 | |
| VIDEO TITLE | Enclosure 11 – Assessment 6 Video 1 | view from front of vehicle | Enclosure 11 – Assessment 6 Video 7 | view from front of vehicle |
| | Enclosure 11 – Assessment 6 Video 2 | view toward front of vehicle | | |
| | Enclosure 11 – Assessment 6 Video 3 | view of front left headlight | | |
| | Enclosure 11 – Assessment 6 Video 4 | view of interior overhead lighting | | |
| | Enclosure 11 – Assessment 6 Video 5 | view of interior overhead lighting | | |
| | Enclosure 11 – Assessment 6 Video 6 | view from front of vehicle after headlight switch change | | |

Segments labeled Video 1 through Video 6 were taken on Vehicle # 5R382, referred to as “2005 RS VIN 5R382.” Video 7 was taken on vehicle # 5R474, referred to as “2005 RS VIN 5R474.”

Enclosure 11 – Assessment 6 Video 1, Enclosure 11 – Assessment 6 Video 2 and Enclosure 11 – Assessment 6 Video 3, demonstrate that the owner’s original complaint of a flicker condition is actually describing a dimming condition where there is no loss of forward lighting. As noted in the videos, the dimming is attributed to momentary voltage fluctuations in the electrical system. These voltage drops were noted to occur during normal operation from momentary spikes in electrical loads, such as radiator fan initiation and accessory electrical draws (e.g., power windows, power seats, heated seats, etc.).

Enclosure 11 – Assessment 6 Video 4 and Enclosure 11 – Assessment 6 Video 5 were taken of the interior of the Minivan featured in the first three videos. These videos demonstrate that momentary system voltage fluctuations result in dimming of all vehicle lighting, and are not isolated to a reduction in headlight illumination intensity.

Enclosure 11 – Assessment 6 Video 6 was recorded after the headlamp switch was replaced in the vehicle featured in Enclosure 11 – Assessment 6 Video 1. This video demonstrates that the dimming condition remains unchanged and is independent of the headlamp switch.

Enclosure 11 – Assessment 6 Video 7 is of a second Minivan (Vehicle # 5R474) where the owner reported a flicker condition. This video serves as an additional demonstration that the owner’s original complaint of a flicker condition is actually describing a dimming condition where there is no loss of forward lighting. As noted in the video, the dimming is attributed to accessory electrical draws, specifically power window operation.

In summary, recorded video of 2005 model year Minivans, where the owners reported incidents of flicker, demonstrate a dimming condition where there is no loss of forward lighting.

- This dimming condition is shown to occur during normal operation from momentary spikes in electrical loads, such as radiator fan initiation or accessory electrical draws (e.g., power windows, power seats, heated seats, etc.).
- System voltage fluctuation results in dimming of all vehicle lighting, and is not isolated to a reduction in headlight illumination intensity.
- The dimming condition is independent of the headlamp switch.

23. State whether or not the Body Control Module (BCM) installed in the subject vehicles can be software reprogrammed (reflashed) with respect to headlight performance and if so describe the process required to conduct the BCM reflash, and state whether or not service technicians at Chrysler dealerships have the equipment and training to conduct a BCM reflash.

A23.

Background

The BCM interprets a voltage input received by the headlamp switch. The instruction given to the BCM as to the intended lighting state is received as (1) an open circuit, (2) a short circuit, or (3) some fraction of a 5 Volt signal. In both states (1) and (2), the BCM instructs the FCM to illuminate both Park and Low Beams if the key is in the ON position. When the key is on the OFF position, the FCM is instructed to turn all exterior lighting off. The voltage returned by the headlamp switch assembly is established based on customer input relative switch position. Switch positions for fog lamps, park lights, headlamps, and auto headlamps each output unique resistance values. The resistance, as applied to the 5 Volt signal, is interpreted by the BCM. The BCM, in turn, instructs the FCM to perform the specified lighting function(s).

The BCM software initiates a check routine to validate voltage values sent to and received by the headlamp switch assembly.

If the BCM detects an unexpected voltage value or an out of range condition from the headlamp switch, the BCM defaults to headlamps on Low Beam when the ignition switch is in the run position.

The BCM software strategy for the headlamp switch has remained consistent, from original release for the 2001 RS, through both the peer and subject vehicles indicated in this investigation.

Feasibility

It should be noted that the BCM software must be modified as an integral change, and not a modular change and/or a data table value change to address any headlamp functionality. The BCM module is near the limit of memory capacity, and intricate logic to modify headlamp functionality may not be possible.

The range of changes to the software regarding headlamp functionality may be limited. The resistance ladder used within the headlamp switch is a governing factor. In order to completely eliminate the headlamp switch voltage output as a cause for the Suspect Condition identified in Assessment 7, from a BCM perspective, the vehicle would have to ensure that a headlamp on to headlamp off only occurred when the vehicle was off, and from a headlamp off to a headlamp on, the vehicle must be running. This would mean that the entire time

the vehicle is running, headlamps would always be on (full power running lights). This would introduce some additional complexity to deal with, such as the dimming of interior lights during daylight hours (as a vehicle not equipped with auto-lamp feature is unable to distinguish between daylight and nighttime). This may also affect other components, such as battery, that may not have been designed or manufactured for this type of duty cycle.

Chrysler has not yet determined whether a software flash to the BCM is feasible, and is currently in the process of completing an evaluation of feasibility and functional compromises that may be involved, and whether or not these compromises may affect any existing lighting compliance requirements.

5.25.12 UPDATE

Chrysler has conducted an evaluation of the feasibility and functional compromises with the implementation of a software change to the BCM and/or FCM to address the alleged defect.

*The original BCM used for the 2005 and 2006 RS vehicle was designed and built by Huntsville Electronics, then owned by Chrysler. The Huntsville business entity was sold to Siemens which subsequently sold the entity to the current owner, Continental. Continental cannot confirm that the entire populations of vehicles that may be affected by a potential field action involving a BCM software modification have the capability to be field flashable. Furthermore, Continental has indicated to Chrysler that it has reason to believe that some portion of the population of vehicles that may be affected by a potential field action involving a BCM software modification are **not** field flashable.*

In addition, a running change was made for the 2005 model year to the FCM to replace the flash Read Only Memory (ROM) with a mask ROM, eliminating the possibility to flash the FCM. Thus, any changes to the system which may require a field flash to the FCM cannot be considered.

For background, there are three functional configurations of the headlamp switch as shown in the following table:

| Configuration | Autolamp | Headlamp Off | Parklamps ON | Headlamps ON | Front Fog lamps ON |
|----------------------|-----------------|---------------------|---------------------|---------------------|---------------------------|
| 1 | X | X | X | X | X |
| 2 | | X | X | X | X |
| 3 | | X | X | X | |

As stated in Chrysler's original response to Q23, "The resistance ladder used within the headlamp switch is a governing factor." This resistance ladder limits the available options which might eliminate the headlamp switch voltage output as a cause for the Suspect Condition.

Simplified Vehicle Voltage Measurements - Headlamp Switch

| Voltage | < 0.315 V | < 1.043 V | < 1.705 V | < 2.148 | < 2.835 | < 3.528 | < 3.986 | < 4.438 | < 4.802 | > 4.802 |
|--------------------------|-----------|------------------------------------|--|----------------------|----------|---------|----------------------|----------|----------------------|---------|
| State | Error | Rear Fog (not applicable to NAFTA) | Headlamp | Headlamp + Front Fog | Parklamp | OFF | Parklamp + Front Fog | Autolamp | Autolamp + Front Fog | Error |
| Switch Position | | Not applicable to NAFTA vehicles | ON | ON + Fog | Parklamp | OFF | Parklamp + Front Fog | AUTO | AUTO + Fog | |
| Alternative 1 | | | | | | | | | | |
| Proposed Changes | Error | | Headlamp ON, Parklamp ON and Front Fog (if equipped) | | | OFF | Parklamp + Front Fog | AUTO | AUTO + Fog | |
| Proposed Switch Position | | | ON or Parklamp | | | OFF | Parklamp + Front Fog | AUTO | AUTO + Fog | |
| Alternative 2 | | | | | | | | | | |
| Proposed Changes | Error | | Headlamp ON, Parklamp ON and Front Fog (if equipped) | | | | | AUTO | AUTO + Fog | |
| Proposed Switch Position | | Any switch position - always ON. | | | | | | AUTO | AUTO + Fog | |

As Chrysler evaluated the vehicle voltage requirements governing the headlamp state as shown in the table above, two possible alternatives were identified as potential software modifications for consideration.

Alternative 1 proposes to eliminate the Parklamp ON state. This would combine the functionality of the Headlamp ON state, Front Foglamp ON state (if equipped), and Parklamp ON state.

Alternative 2 proposes to implement an imitation Daytime Running Light solution. The Headlamps, Parklamps and Front Foglamps (if equipped) would be operating whenever the vehicle is running.

The consequences of these alternatives are as follows:

- There are 21 States and the District of Columbia that have regulations concerning fog lamp displays. Specifically, each vehicle must have a means for indicating to the driver when the fog lamps are "on" or "off". The headlamp switch design for the 2005 and 2006 RS vehicle utilizes a mechanical push-pull toggle to activate the fog lamps. The push pull toggle is contained within the cam selector switch for headlamp state, allowing the customer to activate fog lamps with parklamps or with front headlamps. The Front Fog lamps are available as listed in the following table:*

| State | Active Switches |
|-----------------------------|----------------------------------|
| Off | OFF |
| Parklamps ON | Parklamp ON |
| Parklamps ON / Front Fog ON | Parklamp ON with Fog Lamp toggle |
| Headlamps ON | Headlamp ON |
| Headlamps ON / Front Fog ON | Headlamp ON with Fog Lamp toggle |
| Autolamp | Autolamp |
| Autolamp / Front Fog ON | Autolamp with Fog Lamp toggle |

The Fog Lamp ON indicator light is located within the headlamp switch assembly, and is mechanically activated to illuminate when the user pulls the push-pull toggle outwards. A feedback logic loop to verify that the fog lamps are activated does not exist. Both alternatives above could potentially have a headlamp state wherein the Front Fog lamps are illuminated, along with front Headlamps and Parklamps, without the fog lamp push-pull toggle in the pulled position. This would violate the above State regulations as the Front Fog lamp indicator lamp would not illuminate when the fog lamps are activated.

- 2. In both alternatives, the Headlamp switch control identification would not correlate with the headlamp state without graphics modification. The expectation of the customer positioning the headlamp switch in the Parklamps ON position would be an activation of Parklamps ON, however the actual lighting state would be Headlamp ON, Parklamp ON and Front Fog ON (if equipped). The two detent positions, Headlamp ON and Parklamp ON, would result in the same lighting state. A graphics change to the Parklamp ON position on the headlamp switch to indicate Headlamp ON state may be required.*
- 3. For both alternatives, the performance of an approximately 7 year old headlamp system, including but not limited to, wiring harnesses, headlamp bulbs, headlamp sockets, battery, etc., cannot be predicted when the additional load of full on headlamp, parking lamps and Front Foglamp (if equipped) is considered. This load is beyond the initial design criteria of the vehicle, and significant testing would be required to validate the viability of this option.*
- 4. For alternative 2, during Headlamp ON activation, the interior cluster lights and radio dim to the level set by the position on the dimming wheel control. This could potentially present a situation to the driver wherein the information in the cluster may not be visible during daylight hours without manual intensity adjustment via the dimming wheel control. Conversely, during nighttime driving conditions, the interior cluster lights may be too bright for the driver if the prior driving trip was during the day and the luminous intensity level had been adjusted. This translates into customer dissatisfaction, in addition to unknown durability performance of an aged dimming wheel control not validated to this duty cycle.*
- 5. Alternative 2 results in a system that is nearly the same as a vehicle equipped with Daytime Running Lights (DRL), however, it could not be technically defined as such. The Alternative 2 combination of full intensity headlamp on, Parklamp on and Front Fog on is not consistent with the spirit of the DRL requirements in FMVSS 108. For example, this system would result in full time running lamps that are more than 7½ times the DRL maximum for luminous intensity.*

For the above stated reasons, Chrysler has determined that a software reflash to prevent to the potential for the Suspect Condition to occur is not a feasible solution.

The BCM software for the Subject Vehicle population supported an electrical architecture, flash procedure, and development tools that are no longer used for production vehicles. Chrysler has confirmed that development computers and compilers necessary for any software changes for the BCM are available to develop and validate any software changes for the BCM. However, the equipment has been not been in active use for a Chrysler vehicle since 2005. Any software change would require an entire modification of the software within the BCM, and thus would require a software development and validation program. To date, Chrysler was unable to locate test instrumentation equipment to be used in the development of a BCM software flash. Chrysler is continuing to attempt to locate test equipment and/or alternate options that may assist. In addition, the available code space within the BCM is limited to 72 bytes. Existing code may need to be refactored or deleted to make room for new changes.

Field Flash Capability

The service procedure to flash the BCM for the Subject Vehicle population would involve the use of the Chrysler DRBIII® tool. The Chrysler DRBIII® tool has been replaced by the Chrysler WiTech tool for all new vehicles. It is backward compatible for select vehicles, but not for the 2005, 2006 or 2007 RS. The DRBIII® tool was a standard tool at the time. Chrysler would have to verify if the DRBIII® tool is still be available at all Chrysler dealerships.

BCM Reflash Procedure

The process required to flash the BCM module would follow the process below:

Diagnosis:

1. With the ignition switch in the "RUN" position, determine the original software part number of the BCM currently in the vehicle. Using DRBIII® select:
 - a. "DRBIII® standalone."
 - b. "1998-2005 Diagnostics."
 - c. "All (Except Below)."
 - d. "Body Interior."
 - e. "Body Computer."
 - f. "Module Display."
 - g. Record the "Software part #" on the repair order for later reference.
 - h. Check DTC's.

Repair Procedure:

1. Before beginning a flash procedure, remove any old flash files from the DRBIII ® memory. To clear memory from the MAIN MENU:

- i. Simultaneously press the "MORE" and "YES" keys.
 - j. A screen will appear requesting a "COLD BOOT."
 - k. Follow the on screen instructions by selecting the "F4" key.
 - l. When the DRBIII® reboots to the MAIN MENU, proceed to Step #2.
2. Connect the DRBIII® to TechCONNECT. Open TechTOOLS and verify that the DRBIII® Status: Connected" message is in the upper right corner of the TechTOOLS screen.
3. Enter the "BCM part #," recorded in "Diagnosis Step #1," in the "Parts Criteria" area and select "Show Updates." TechTOOLS will populate the appropriate flash file.
4. Select the flash file.
5. Select "DRBIII®" radio button which is next to the "Download/Update" button.
6. Select the "Download/Update" button.

Note: If this flash process is interrupted or aborted, the flash process should be restarted and then follow the directions on the DRBIII®.

| EA11-010 Enclosure 11 - Assessment 5 Customer Survey Results | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|
| 19150712 | My lights in the dash, the gauges, the radio, and the head lights all flash radically and continuously as I drive down the road. | | | | | | | | | | | | | | | Attempted to call customer to discuss light flicker issue. Number on file has been disconnected or no longer in service per message. Per Cair above customer has sold vehicle over 2 years ago. |
| 19224172 | The gauges started to flicker. | | | | | | | | | | | | | | | Called customer regarding light flicker issue. Left message with agents phone of 248-944-7218 for customer to return call to discuss. |
| 19276868 | Pulsating of all his lamps, including his headlights. | | | | | | | | | | | | | | | Attempted to contact customer on light dimming issue. No answer. Left customer a message requesting return call to discuss issue. |
| 19284450 | Customer states the dealer said that it is normal for the lights to dim | | | | | | | | | | | | | | | Agent left number 248-944-7218 for return call. |
| 19301753 | Customer stated that she is experiencing some electrical issues. | | | | | | | | | | | | | | | Attempted to contact Susan Hughes to ask about headlight flicker issue. Called number 618-262-8518 and person who answered the phone indicated that she was not at that number. No alternate number is listed on file and COIN now showing different owner. |
| 19304309 | Air bag light goes on and off, her door locks do not work and head lights flicker. | | | | | | | | | | | | | | | Attempted to contact customer to ask about light flicker issue at phone number 610-767-8764. Message indicated number had been disconnected. |
| 19412765 | The headlights will flash on and off, the needles in the gauges bounce up and down, the radio will turn on and off, and the AC will turn on and off. | | | | | | | | | | | | | | | Customer stated she wanted to make sure her case was closed because she traded in the vehicle on 05/16/09 and she made sure it was not a Dodge or Chrysler product. |
| 19453145 | The dash lights and headlights keep flashing on and off on her vehicle. | | | | | | | | | | | | | | | Call would then be disconnected from customers end. No further info was able to be obtained from this customer on light flicker issue that could be added to info above. |
| 19821566 | The interior lights and radio and head lights were going on and off. | | | | | | | | | | | | | | | Left message for customer to call agent back at 248-944-7218 to discuss flickering light issue. |
| 19863767 | Vehicle gauges intermittently fluctuate on and off and the radio goes in and out and the headlights look like they are shaking. | | | | | | | | | | | | | | | Left message for customer requesting call back to answer light flicker questionnaire. |
| 20207099 | The headlights are sometimes flickering. | | | | | | | | | | | | | | | Left message for customer indicating agents phone number of 248-944-7218 and that I was calling to ask questions about the light flicker issue listed in this Cair and would request a call back from the customer. |
| 20337826 | Head lights / dash lights / radio / other instruments flicker. | | | | | | | | | | | | | | | Called customer multiple times to ask questions about flickering light issue. Each time phone would ring and person answering the phone would disconnect even before I could identify myself. |
| 20720618 | Dash lights flicker, vehicle stalls at low speeds, head lights flicker. | | | | | | | | | | | | | | | Attempted to contact customer at phone number 580-236-9326 3 times to ask questions on light flicker issue as reported in this Cair. Line would ring quick busy then just beep like line was no longer in service. |
| 21114474 | The dash lights, headlights start blinking, the gauges start sweeping back and forth and if I am idling the motor dies. | | | | | | | | | | | | | | | Attempted to contact customer with questionnaire regarding light flicker issue. No answer. |
| 18282771 | Intermittent electrical issues, instrument and headlamp flickering, and stalling. | | | | | | | | | | | | | | | Left message with agents direct line asking customer to call back if they are willing to answer questions regarding issue. |
| 22004173 | | | | | | | | | | | | | | | | Attempted to contact customer regarding previous light flicker issue. No answer/ no message. Will attempt to call back. Cannot leave message on second attempt. Closing CAIR. |

| EA11-010 Enclosure 11 - Assessment 5 Customer Survey Results | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 22010752 | | | | | | | | | | | | | | Attempted to contact customer to question about the light flicker issue per engineering request. Line has been disconnected. |
| 22011314 | | | | | | | | | | | | | | Attempted to contact customer to ask questions regarding light flicker issue per engineering request. Customer number on file has been disconnected. |
| 22013219 | | | | | | | | | | | | | | Called customer to inquire about light flicker issue per engineering request. Left message asking to have him call me about issue if he would be willing to answer some questions. |