HYUNDAI-KIA
AMERICA TECHNICAL CENTER, INC.

August 27, 2010

VIA FEDERAL EXPRESS
D. Scott Yon, Chief
Vehicle Integrity Division
Office of Defects Investigation
U.S. Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue, S.E.
Washington D.C. 20590

Re: **Preliminary Evaluation (PE10-023)**
Fuel Expulsion and/or Fuel Flow Restriction (MY) 2003 Kia Sorento

Dear Mr. Yon:

This letter is submitted in response to your letter dated July 14, 2010 sent to Hyundai America Technical Center, Inc. ("HATCI") (Reference NVS-212lhs/PE10-023). That letter requested information regarding the allegations of fuel expulsion and/or fuel flow restriction during refueling on certain MY 2003 Kia Sorento vehicles. Those vehicles are not manufactured by HATCI nor is HATCI otherwise involved in their manufacture. They were manufactured by Kia Motors Corp. ("KMC"). Although HATCI is an organization independent of both KMC and Kia Motors America, Inc. ("KMA"), it has been designated by those organizations to act as their communication liaison with the National Highway Traffic Safety Administration ("NHTSA"). This response is submitted to NHTSA by HATCI in that limited role.

INTRODUCTORY STATEMENT

We are providing responses to requests 1-8, part of 9, and 10 contained in your July 14th letter and will be providing the remaining information by September 17, 2010. Although we have requested an extension for Kia on the analysis section until that later date, it has been necessary to conduct analysis of the fuel system of the 2003 Sorento in order to respond in a meaningful way to your letter, and that preliminary analysis thus appears at various points in this response. Specifically, the alleged issue had surfaced so late after production, and had not been previously identified by Kia, so that the typical anslysis focused on production parts was not helpful. Specifically, Kia has been unable to identify any product improvements in the 2003 Sorento fuel system which should have eliminated a fuel filling issue. Thus, Kia went back to a review of an understanding of how the fuel system operates in this vehicle model in order to evaluate the information available. That is, all modern fuel systems generate vapors which must be managed, and a properly functioning fuel system for both safety and emissions purposes controls the tank pressure in order to direct fuel vapors to the engine while releasing air without hydrocarbons (HC) into the atmosphere. Kia believes that any component defect historically

Hyundai-Kia America Technical Center Inc.
6800 Geddes Road, Superior Township, MI 48198
TEL: 734-337-9499 FAX: 734-483-5919
www.hatci.com

known to cause this type of issue would have been clearly visible soon after purchase. A review of the history of complaints for this complaint however shows no such trend. The fact that the majority of the complaints occur later in ownership for the 2003 Sorento thus suggests a non-component defect cause for the recent complaints.

REQUEST NO. 1:

State, by model and any appropriate sub-group, the number of subject vehicles manufactured by Kia for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by Kia, state the following:

a. Vehicle Identification number (VIN);
b. Make;
c. Model;
d. Model Year;
e. Date of manufacture;
f. Date warranty coverage commenced; and
g. The State in the United States where the vehicle was originally sold or leased (or delivered for sale or lease).

Provide the table in Microsoft Access 2000, or a compatible format, entitled "PRODUCTION DATA."

RESPONSE TO REQUEST NO. 1:

The total number of 2003 MY Sorento vehicles manufactured for sale in the United States is 42,831. A listing of all 2003 Kia Sorento vehicles is provided on a Data Collection Disc under the category "PRODUCTION DATA" and submitted contemporaneously with this response.

REQUEST NO. 2:

State the number of each of the following, received by Kia, or of which Kia is otherwise aware, which relate to, or may relate to, the alleged defect in the subject vehicles:

a. Consumer complaints, including those from fleet operators;
b. Field reports, including dealer field reports;
c. Reports involving a crash, injury, or fatality, based on claims against the manufacturer involving a death or injury, notices received by the manufacturer alleging or proving that a death or injury was caused by a possible defect in a subject vehicle, property damage claims, consumer complaints, or field reports;
d. Property damage claims, alleged to have resulted from alleged defect;
e. Third-party arbitration proceedings where Kia is or was a party to the arbitration; and
f. Lawsuits, both pending and closed, in which Kia is or was a defendant or codefendant.

For subparts "a" through "c," state the total number of each item (e.g., consumer complaints, field reports, ect.) separately. Multiple incidents involving the same vehicle are to be counted separately. Multiple reports of the same incident are also to be counted separately (i.e., a consumer complaint and field report involving the same incident in which a crash occurred are to be counted as a crash report, a field and a consumer complaint).

In addition, for items "c" through "f," provide a summary listing of the alleged problem and causal and contributing factors, and Kia's assessment of the problem with a summary of the significant underlying facts and evidence. For items "e" and "f," identify the parties to the action, as well as the caption, court, docket number, and date on which the complaint or other document was filed to initiate the action.

RESPONSE TO REQUEST NO. 2:

Kia has identified all of the complaints related to the alleged defect without regard to the identified causal part, or Nature Code or Cause Code.

a. Consumer Communications—54

b. Field Reports—4

   Technical Assistance Reports—67

c. Reports involving crash, injury or fatality alleging death or injury was caused by possible defect—0

d. Property Damage Claims—0

e. Third Party Arbitrations—0

f. Lawsuits—0

Kia's search included all files through July 20, 2010 which included the words "fuel" and "spill", "spit", "fill", "expel", "expulsion", "restrict", "overflow", "spew", "splash", "spray". A search was also conducted using the words "gas" and "spill", "spit", "fill", "expel", "expulsion", "restrict", "overflow", "spew", "splash", "spray". The results were then reviewed to identify those items which related, or may relate to the alleged defect as described in your letter.

REQUEST NO. 3:

Separately, for each item (complaint, report, claim, notice, or matter) within the scope of your response to Request No. 2, state the following information:

a. The category of the item, as identified in Request No. 2 (i.e., consumer complaint, field report, ect. [sic];
b. Vehicle owner or fleet name (and fleet contact person), address, and telephone number;
c. Vehicle's VIN;
d. Vehicle's make, model and model year;
e. Vehicle's mileage at time of incident;
f. Incident date;
g. Report or claim date ;
h. Whether a loss of vehicle control or crash is alleged;
i. Whether property damage is alleged;
j. Number, type and severity of alleged injuries, if any; and
k. Number of alleged fatalities, if any.

Provide this information in Microsoft Access 2000, or a compatible format, entitled "REQUEST NUMBER TWO DATA."

RESPONSE TO REQUEST NO. 3:

A listing of all responsive communications is provided on a Data Collection Disc under the category "REQUEST NUMBER TWO DATA".

REQUEST NO. 4:

Produce copies of all documents related to each item within the scope of Request No. 2. Organize the documents separately by category (i.e., consumer complaints, field reports, etc.) and describe the method Kia used for organizing the documents.

RESPONSE TO REQUEST NO. 4:

Copies of the documents identified in response to Request No. 2 are submitted with this letter. They are organized by the following categories:

- Consumer Affairs Department files from KMA's department database (54)
- Field Reports (4)
- Technical Assistance Case Center Reports (67)

See **Tab 1**.

REQUEST NO. 5:

State, by model and any appropriate sub-group, a total count for all the following categories of claims, collectively, that have been paid by Kia to date that relate to, or may relate to, the alleged defect in the subject vehicles: warranty claims; extended warranty claims; claims for good will services that were provided; field, zone, or similar adjustments and reimbursements; and warranty claims or repairs made in accordance with a procedure specified in a technical service bulletin or customer satisfaction campaign.

Separately, for each such claim, state the following information:

a. Kia's claim number;
b. Vehicle owner or fleet name (and fleet contact person) and telephone number;
c. VIN;
d. Repair date;
e. Vehicle mileage at time of repair;
f. Repairing dealer's or facility name, telephone number, city and state or ZIP code;
g. Labor operation number;
h. Problem code;
i. Replacement part number(s) and description(s);
j. Concern stated by customer; and
k. Comment, if any, by dealer/technician relating to claim and/or repair.

Provide the detailed information in Microsoft Access 2000, or a compatible format, entitled "WARRANTY DATA."

RESPONSE TO REQUEST NO. 5:

A listing of the responsive warranty claims through July 20, 2010 is provided on a Data Collection Disc under the category "WARRANTY DATA".

REQUEST NO. 6:

Describe in detail the search criteria used by Kia to identify the claims identified in response to Request No. 5, including the labor operations, problem codes, part numbers and any other pertinent parameters used. Provide a list of all labor operations, labor operation descriptions, problem codes, and problem code descriptions applicable to the alleged defect in the subject vehicles. State, by make and model year, the terms of the new vehicle warranty coverage offered by Kia on the subject vehicles (i.e., the number of months and mileage for which coverage is provided and the vehicle systems that are covered). Describe any extended warranty coverage option(s) that Kia offered for the subject vehicles and state by option, model, and model year, the number of vehicles that are covered under each such extended warranty.

RESPONSE TO REQUEST NO. 6:

Based on the definition of "subject component", Kia is providing all repair/replacement warranty claim data for the Fuel Tank[1] and Filler Neck Assembly. Kia also searched within the 2003 Kia Sorento system as it functioned in the field for all warranty claims for those "components that may potentially cause the fuel to expel and/or impede the flow of fuel during refueling" in that model. Kia's analysis of the system shows that these components would include the Non-Return Valve, ORVR Valve, Rollover Valve, and Canister Assembly. Kia also investigated the air filter data, but this data does not appear in a useful manner, since that component is a "wear and tear" item and is not a warranted part. As a result, no data for an air filter replacement will usually show up, even if a dirty or clogged air filter is the cause of the condition.

All warranty claims reflecting the alleged defect have been provided, regardless of whether the technician properly analyzed and repaired the condition.

Codes Used. In your letter, you requested that Kia provide its "problem code" information. Kia refers to the "problem code" as the "cause code", which carries the letter "C" which reflects the technician's evaluation of the cause of the problem. You also requested that Kia provide information regarding "concerns stated by the customer". Kia's code chart refers to these as "condition codes," but they are commonly referred to as "nature codes," and carry the "N" designation. These reflect the service writer's or technician's understanding of the customer's information.

A copy of KMA's coding sheet for warranty claims is submitted with this response. **See Tab 2.**

The 2003 MY Sorento vehicles have a 5 year, 60,000 mile basic warranty. No extended or additional warranties were provided to Kia customers.

REQUEST NO. 7:

Produce copies of all service, warranty, and other documents that relate to, or may relate to, the alleged defect in the subject vehicles, issued by Kia to any dealers, regional or zone offices, field offices, fleet purchasers, or other entities. This includes, but is not limited to, bulletins, advisories, informational documents, training documents, or other documents, or communications, with the exception of standard shop manuals. Also include the latest draft copy of any communication that Kia is planning to issue within the next 120 days.

RESPONSE TO REQUEST NO. 7:

There are no documents responsive to this request.

---

[1] The Rollover Valve is part of the fuel tank and cannot be repaired independently so its evaluation is inherently included with the fuel tank warranty claim data.

REQUEST NO. 8:

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 Kia. 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 interim, draft, or final form. Organize the documents chronologically by action.

RESPONSE TO REQUEST NO. 8:

None.

REQUEST NO. 9:

Provide a complete engineering description and appropriate engineering specifications of the subject component installed in the subject vehicles, specifically including all components that provide for, or that may restrict, the free flow of fuel during refueling. Identify by MY, make, and model, all other vehicles equipped with identical subject components, manufactured for sale or lease by Kia in the United States. For each other MY, make and model of vehicles equipped with identical subject components, provide separate counts of the numbers of consumer complaints, field reports, and warranty claims received by Kia to date.

RESPONSE TO REQUEST NO. 9:

In the refueling operation for the 2003 Sorento, as the fuel passes down the filler neck and into the bottom of the tank, the non-return valve which is spring loaded creates a seal which prevents fuel and fuel vapors from escaping back up through the filler neck. As fuel enters the fuel tank, it compresses the air in the tank upwards and is allowed to exit the tank past the ORVR valve at the top of the tank, until a predetermined fill level is reached, at which time the ORVR valve closes. Any fuel vapors which exit then or later pass through pipes until those HC vapors are trapped in the canister assembly. The canister contains activated charcoal and is designed to absorb and hold any fuel vapors in order to prevent them from escaping into the atmosphere and causing air pollution. Air without HC emissions is intended to exit the canister and travel through the canister close valve (CCV) before traveling past the air filter and into the atmosphere. The canister must be periodically purged of vapors so that the charcoal maintains

its absorbing capability. During the purging process, the purge control solenoid valve (PCSV) opens and allows the vacuum caused by the engine to pull fresh air through the air filter past the CCV in its normal open position, and through the canister, and PCSV into the engine.

The PCSV's second function is to test the evaporative seal in the system to ensure that vapors are not leaking into the atmosphere. This test is performed by using the vacuum function and instructing the CCV to close so that the vacuum can be measured. The CCV in the 2003 Sorento had a history of remaining open, thus preventing a full vacuum from being identified, and resulting in a small or large leak code and setting off the MIL. This condition cannot be the cause of difficulty in fueling, since the open valve makes it easy for fuel to enter the fuel tank.

A key element to allowing the system to operate properly is maintenance on the air filter and specifically its replacement on a 15,000 maintenance schedule. If the filter is allowed to get too dirty, it will prevent the flow of fresh air into the system and through the canister, thus allowing HC vapors to be pulled into the engine. Over time, the unpurged vapors in the canister will cause pressure buildup in the fuel tank, thus causing difficulties in filling the tank and, if allowed to become very clogged without maintenance, to cause incidents of fuel spitting out the fuel filler neck.

The alleged defect would be caused by a buildup of pressure within the fuel system. In relation to the 2003 Sorento, the conceptual sources of this could be the non return valve (NRV), the ORVR, the rollover valve (ROV), the canister or the air filter. However, only the air filter can be identified as a serious candidate, based on a failure to replace the filter when it becomes dirty. **See Tab 3** for a diagram illustrating the system.

See Tab 4 for the engineering specifications.

Pursuant to the extension you granted KMA on August 19, 2010, we will provide the information regarding potential alleged defect parts in the 2003 Sorento which are used in other Kia models on September 17, 2010.

REQUEST NO. 10:

Describe all modifications or changes made by, or on behalf of, Kia in the design, material composition, manufacture, quality control, supply, or installation of the subject component, from the start of production to date, which relate to, or may relate to, the alleged defect in the subject vehicles. For each such modification or change, provide the following information:

a. The date or approximate date on which the modification or change was incorporated into vehicle production;
b. A detailed description of the modification or change;
c. The reason(s) for the modification or change;
d. The part number(s) (service and engineering) of the original component;
e. The part number(s) (service and engineering) of the modified component;

f. Whether the original unmodified component was withdrawn from production and/or sale, and if so, when;
g. When the modified component was made available as a service component; and
h. Whether the modified component can be interchanged with earlier production components.

Also, provide the above information for any modification or change that Kia is aware if which may be incorporated into vehicle production within the next 120 days.

RESPONSE TO REQUEST NO. 10:

There have been no modifications or changes that relate to the alleged defect.

REQUEST NO. 11:

Provide Kia's assessment of the alleged defect in the subject vehicles, including:

a. The causal or contributory factor(s);
b. The failure mechanism(s);
c. The failure mode(s);
d. The risk to motor vehicle safety that it poses;
e. What warnings, if any, the operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning; and
f. The reports included with this inquiry.

RESPONSE TO REQUEST NO. 11:

a. **Causal or contributory factors for fuel expulsion and/or abnormal restriction in the free flow of fuel.** Kia's preliminary analysis of the alleged defect is that it is not related to a warranted component, but is rather likely caused by a failure to change the fuel air filter when it becomes dirty. The development of the alleged defect so late in ownership supports this conclusion. Kia will continue to analyze this until its September 17, 2010 response.

b. **The failure mechanism for fuel expulsion and/or abnormal restriction in the free flow of fuel.** The impeded flow of air through the air filter will over time cause a gradual build-up of pressure in the fuel system and impede the flow of fuel into the tank and, in extended circumstances, lead to the possibility of spitback. Kia will continue to analyze this until its September 17, 2010 response.

c. **The failure mode for fuel expulsion and/or abnormal restriction in the free flow of fuel.** The fuel air filter correctly prevents dirt from entering the system when the purge function pulling air through the canister is performed. As the filter openings fill with dirt, the purging function is reduced if the filter is not replaced. This will result in a blockage of vapors when they

reach the canister and buildup of pressure in the tank, and difficulty in fueling will eventually result. Kia will continue to analyze this until its September 17, 2010 response.

d. **The risk to motor vehicle safety that it poses.** Pursuant to the extension you granted KMA on August 19, 2010, we will provide the response to subpart (d) on September 17, 2010.

e. **What warnings, if any, the operator and other person persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning.** Pursuant to the extension you granted KMA on August 19, 2010, we will provide the response to subpart (e) on September 17, 2010.

f. **The reports included with this inquiry**. Pursuant to the extension you granted KMA on August 19, 2010, we will provide the response to subpart (f) on September 17, 2010.

Sincerely,

Robert Babcock

Robert Babcock
Senior Manager, Regulation and Certification Department