GM GENERAL MOTORS NORTH AMERICA
Structure & Safety Integration

2/28/07

February 23, 2007

Thomas Z. Cooper, Chief
Vehicle Integrity Division
Office of Defects Investigation
NHTSA Enforcement
Room #5326
400 Seventh Street, S.W.
Washington, D.C. 20590

N060230

NVS-212.pco
RQ06-009

Dear Mr. Cooper:

This letter is General Motors' (GM) response to your Recall Query (RQ05-009), dated December 22, 2006. This response provides information regarding allegations of fuel leakage and/or odor originating from the area of the inlet check valve (ICV) filler pipe/fuel tank interface, similar to the condition identified in recall 03V454, on 2001 – 2004 model year (MY) Aztek/Rendezvous vehicles and all other model year GM vehicles equipped with the same subject components.

The subject vehicles for this inquiry are 2001 – 2004 (MY) Pontiac Aztek/Buick Rendezvous vehicles and 2001 – 2004 (MY) Chevrolet Venture/Pontiac Montana/Oldsmobile Silhouette vehicles because the ICV and ICV/fuel tank interface are similar.

Your questions and our corresponding replies are as follows:

1. **State within the body of the response letter, by model and model year, the total number of subject vehicles GM has manufactured for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by GM, state the following:**

   a. **Make;**
   b. **Model;**
   c. **Model Year;**
   d. **Vehicle identification number (VIN);**
   e. **Date of manufacture (in "yyyy/mm/dd" date format);**
   f. **Date warranty coverage commenced (in "yyyy/mm/dd" date format) or "Unsold" if not sold;**
   g. **All wheel drive or front wheel drive; and**
   h. **The State in the United States where the vehicle was originally sold or leased (or delivered for sale or lease).**

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

   General Motors is providing the number of subject vehicles produced for sale or lease in the United States by make, model and model year in Table 1 below:

MAKE/MODEL	2001 MY	2002 MY	2003 MY	2004 MY	TOTAL
Pontiac Aztek	41,082	17,886	29,565	20,853	109,386
Buick Rendezvous	N/A	77,570	67,237	68,041	212,848
Chevrolet Venture	85,358	84,119	97,992	76,771	344,240
Pontiac Montana	50,441	45,559	45,939	30,277	172,216
Oldsmobile Silhouette	36,278	23,865	18,331	9,420	87,894
TOTAL	213,159	248,999	259,064	205,362	926,584

TABLE 1 VEHICLE PRODUCTION
N/A – Not Applicable

The production information requested in 1a-1h is provided on the on the Att_1_GM disk in the folder labeled Q_01 refer to the Microsoft Access 2000 file labeled, "Q_01_PRODUCTION DATA". GM is providing the state where the vehicle was shipped in response to request 1h. For some of the subject vehicles, which have incomplete warranty files, the GM warranty system does not contain a warranty start date or state where the vehicle was shipped and, therefore, these fields are blank in the Microsoft Access 2000 file.

2. **State within the body of the response letter, the number of each of the following, received by GM, or of which GM 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/fire, 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 (including own vehicle); and**
   e. **Third-party arbitration proceedings where GM is or was a party to the arbitration; and**
   f. **Lawsuits, both pending and closed, in which GM is or was a defendant or codefendant.**

   For subparts "a" through "d," state the total number of each item (e.g., consumer complaints, field reports, etc.) 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 a field report involving the same incident in which a crash occurred are to be counted as a crash report, a field report and a consumer complaint). Identify reports that have a duplicate with either other mfg reports/claims or with ODI.

   In addition, for subparts "d" through "f," identify the parties to the action, as well as the caption, court, docket number, and date on which the complaint or other document initiating the action was filed.

Table 2-1 below summarizes records that could relate to the alleged defect. GM has organized the records by the GM file number within each attachment.

Type of Report	GM Reports	Subcategories				
		Corresponding to NHTSA Reports	Number with Property Damage	Number with Crash	Number with Injuries/ Fatality	Number with Fire*
Owner Reports	249	4	2	0	0	0
Field Reports	35	0	0	0	0	0
Not-In-Suit Claims	1	0	1	0	0	0
Subrogation Claims	2*	1	0	0	0	2*
Third Party Arbitration Proceedings	0	0	0	0	0	0
Product Liability Lawsuits	0	0	0	0	0	0
Total Reports (Including Duplicates)	287	5	3	0	0	2*
Total Vehicles with Reports (Unique VIN)	286	5	2	0	0	2*

Table 2-1: Report Breakdown

* The subrogation claims "may relate" to the alleged defect, however, the records do not indicate that the alleged defect was present.

To date, GM's investigation of the alleged defect has not included an assessment of the cause(s) of each incident responsive to Request No. 2. Some incident reports may not contain sufficient reliable information to accurately assess cause. Assessments of other incidents (from lawsuits and claims) may be attorney work product and/or privileged. Therefore, information and documents provided in this response, if any, consist only of non-attorney work product and/or non-privileged material for incidents that have been investigated and assessed.

The sources of the requested information and the last date the searches were conducted are tabulated in Table 2-2 below.

SOURCE SYSTEM	LAST DATE GATHERED
Customer Assistance Center	1/22/2007
Technical Assistance Center	1/08/2007
Field Information Network Database (FIND)	1/29/2007
Field Product Report Database (FPRD)	1/29/2007
Company Vehicle Evaluation Program (CVEP)	1/08/2007
Captured Test Fleet (CTF)	1/08/2007
Early Quality Feedback (EQF)	1/08/2007
Legal / Employee Self Insured Services (ESIS)/Product Liability Claims/ Lawsuits	1/18/2007

TABLE 2-2: DATA SOURCES

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. **GM's file number or other identifier used;**
   b. **The category of the item, as identified in Request No. 2 (i.e., consumer complaint, field report, etc.);**
   c. **Vehicle owner or fleet name (and fleet contact person), address, and telephone number;**
   d. **Vehicle's VIN;**
   e. **Vehicle's make, model and model year;**
   f. **Vehicle's mileage at time of incident;**
   g. **Incident date (in "yyyy/mm/dd" date format);**
   h. **Report or claim date (in "yyyy/mm/dd" date format);**
   i. **Whether a crash is alleged;**
   j. **Whether a fire is alleged;**
   k. **Whether property damage is alleged;**
   l. **Number of alleged injuries, if any;**
   m. **Number of alleged fatalities, if any.**

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

   The requested information is provided on the Att_1_GM disk in the folder labeled Q_03 refer to the Microsoft Access 2000 file labeled, "Q_03_REQUEST NUMBER TWO DATA".

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 GM used for organizing the documents.**

   Copies of the records summarized in Table 2-1 are on the Att_1_GM disk embedded in the folder labeled Q_03; refer to the Microsoft Access 2000 file labeled, "Q_03_REQUEST NUMBER TWO DATA". GM has organized the records by the GM file number within each attachment.

5. **State within the body of the response letter, by model and model year, a total count for all of the following categories of claims, collectively, that have been paid by GM 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. If claim is associated with recall 03V454, so state.**

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

   a. GM's claim number;
   b. Vehicle owner or fleet name (and fleet contact person) and telephone number;
   c. VIN;
   d. Repair date (in "dd/mm/yyyy" date format);
   e. Vehicle mileage at time of repair;
   f. Repairing dealer's or facility's 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 this information in Microsoft Access 2000, or a compatible format, entitled "WARRANTY DATA."

Tables 5-1 and 5-2 summarize by model year the regular, goodwill and extended warranty claims for the subject vehicles that were collected by searching the labor codes and trouble codes that may be related to the alleged defect. A list of the labor codes and trouble codes is provided in response to item No. 6. A summary of the warranty claims, including the information requested in 5(a-k), is provided on the Att_1_GM disk in the folder labeled Q_05; refer to the Microsoft Access 2000 file labeled, "Q_05_WARRANTY DATA."

REGULAR WARRANTY CLAIMS FOR FUEL TANK REPLACEMENT

MAKE/MODEL	2001 MY	2002MY	2003 MY	2004 MY	TOTAL
Pontiac Aztek	296	114	379	91	880
Buick Rendezvous	0	483	936	179	1,598
Chevrolet Venture	282	215	600	110	1,207
Pontiac Montana	158	136	348	41	683
Oldsmobile Silhouette	76	23	12	15	126
TOTAL	812	971	2,275	436	4,494

TABLE 5-1

EXTENDED WARRANTY CLAIMS FOR FUEL TANK REPLACEMENT

MAKE/MODEL	2001 MY	2002MY	2003 MY	2004 MY	TOTAL
PONTIAC AZTEK	60	34	47	8	149
BUICK RENDEZVOUS	0	159	120	12	291
CHEVROLET VENTURE	68	50	46	4	168
PONTIAC MONTANA	34	34	34	3	105
OLDSMOBILE SILHOUETTE	49	42	1	3	95
TOTAL	211	319	248	30	808

TABLE 5-2

The sources of the requested information and the last date the searches were conducted are tabulated in Table 5-3 below.

SOURCE SYSTEM	LAST DATE GATHERED
GM CARD --regular warranty	1/05/2007
Motors Insurance Corporation (MIC) – extended warranty	1/18/2007
Universal Warranty Corporation (UWC) – extended warranty	1/08/2007

TABLE 5-3: DATA SOURCES

The warranty data provided has limited analytical value in analyzing the field performance of a motor vehicle component. The warranty records do not contain sufficient information to establish the condition of the part at the time of the warranty correction; and service personnel may not consistently use the appropriate labor and trouble codes. Warranty numbers represent claims by our dealers for reimbursement for parts and labor costs incurred in performing warranty service for our customers. Consequently, some of these warranty claims are not related to the alleged defect.

GM's warranty database does not contain the following information: vehicle owner's name or telephone number, replacement part number description, or customer concern statement. GM is providing a field labeled "Verbatim Text" in response to request 5K (dealer/technician comment). The verbatim text is an optional field in the GM warranty system for the dealer to enter any additional comments that may be applicable to the warranty claim. The verbatim text field is not required to be completed for every warranty claim.

The MIC extended warranty system does not contain the following information: repairing dealer code, vehicle owner information, trouble code, trouble code description, part number, part description or verbatim. The UWC extended warranty system does not use the GM labor code or labor code description and it does not contain the repairing dealer code, trouble code or trouble code description.

6. **Describe in detail the search criteria used by GM 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 (including the subject component) offered by GM 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 GM 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.**

To search for and collect the warranty data for this response the GM Claim Adjustment Retrieval Database (CARD) regular warranty database and the Motors Insurance Corp (MIC) extended warranty database were searched using the labor codes listed in table 6-1. Universal Warranty Corporation (UWC) does not use labor codes or trouble codes.

LABOR CODE	DESCRIPTION:
L1260	TANK, FUEL - REPLACE
Z1241	PRODUCT LIABILITY/INVESTIGATION REP PR (GOODWILL)
Z1242	PAR – REPAIRS/REIMBURSEMENT (GOODWILL)

TABLE 6-1 LABOR CODES USED IN WARRANTY SEARCH

The labor codes Z1241 and Z1242 can be used by dealers for reimbursement for goodwill warranty repairs. They are not specific to replacement of the fuel tank. GM reviewed the goodwill claims collected using these labor codes and claims that clearly did not relate to replacement of the fuel tank based on a review of the dealer verbatim, customer code, trouble code, repair cost and vehicle VIN are not being provided.

GM lists the trouble codes in Table 6-2 and the customer complaint codes in Table 6-3, within the L1260 labor code, that may relate to replacement of the fuel tank due to fuel leakage and/or odor originating from the area of the inlet check valve filler pipe/fuel tank interface.

Trouble Code	Description	Trouble Code	Description
1B	Casting Defect	3R	Porosity
1D	Broken	3W	Punctured
1H	Clogged/Restricted/Blocked	3Z	Ruptured
1J	Collapsed	4D	Sheared
1K	Cracked	4H	Torn
1L	Cut	4N	Warped/Wavy/Wrinkled
1N	Burrs	4Q	Weak
1W	Condensation-Moisture	4R	Weld Broken
2E	Clearance-Excessive	4S	Weld Omitted
2G	Improperly Cut	4X	Worn
2H	Improperly Installed	5W	Rusted/Corroded
2K	Improperly Sealed	6C	Component-Inoperative
2L	Incorrect Pressure	6D	Component-Intermittent
2P	Insufficient Sealant	6F	Component-Open
2T	Incorrect Torque	6J	Connector-Corroded
2W	Loose	6P	Connector-Seal Damaged
3F	Not Connected	98	Customer Satisfaction
3N	Poor Machining	OB	OBD II Used

Table 6-2 Trouble Codes used in Warranty Search

Customer Complaint Code	Description:
MJ	Misc: Customer Satisfaction
OH	Operation: Excessive Play (Fumes)
OI	Operation: Fumes (Hard Shift)
ON	Operation: Loose
OP	Operation: Odor
VB	Visual: Broken
VE	Visual: Cracked
VL	Visual: Flutter (Leaks)
VN	Visual: Leak/Leaks (Missing)
VP	Visual: Misaligned (Orange Peel)
VV	Visual: Peeling (Scratches-Deep)
V4	Visual: Split Seam (Torn/Punctured)
V9	Visual: Torn/Punctured (Wrinkled)
WG	Warning Lights: Service Engine Soon

Table 6-3 Customer Complaint Codes used in Warranty Search

GM then reviewed these warranty claims, any claims that clearly did not relate to the alleged defect based on a review of the dealer verbatim, replacement part number or replacement part cost were removed and are not being provided.

The warranty data provided has limited analytical value in analyzing the field performance of a motor vehicle component. The warranty records do not contain sufficient information to establish the condition

of the part at the time of the warranty correction; and service personnel may not consistently use the appropriate labor and trouble codes. Warranty numbers represent claims by our dealers for reimbursement for parts and labor costs incurred in performing warranty service for our customers.

The subject vehicles are covered by a bumper-to-bumper new vehicle warranty for three years or 36,000 miles whichever occurs first. Many different extended warranty options are available through GM dealerships. They are offered at different prices and for varying lengths of time, based on customer's preference, up to 7 years from the date of purchase or up to a total of 100,000 vehicle miles. The General Motor's warranty system does not contain information on the number of vehicles that have extended warranty coverage. The number of extended warranty coverage contracts on the subject vehicles that have been sold by MIC regardless of status (in-force, expired, cancelled) as of January 18, 2007 is contained in Table 6-4.

MAKE/MODEL	2001 MY	2002MY	2003 MY	2004 MY	TOTAL
PONTIAC AZTEK	12,702	7,315	7,539	3,913	31,469
BUICK RENDEZVOUS	N/A	24,496	16,866	12,658	54020
CHEVROLET VENTURE	23,197	20,191	21,125	12,499	77,012
PONTIAC MONTANA	14,653	12,103	10,490	5,500	42,746
OLDSMOBILE SILHOUETTE	31,607	17,412	7,393	3,150	59,562
TOTAL	82,159	81,517	63,413	37,720	264,809

TABLE 6-4: MIC EXTENDED WARRANTY COVERAGE CONTRACTS SOLD
N/A – Not Applicable

7. **Produce copies of all service, warranty, and other documents that relate to, or may relate to, the alleged defect in the subject vehicles (all issued revisions), that GM has issued 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 GM is planning to issue within the next 120 days.**

GM found two service, warranty and/or other informational documents that may relate to the subject condition that have been issued to dealers, regional or zone offices, field offices, fleet purchasers or other entities. Product Safety Bulletin #03055, issued to dealers in November 2003 regarding fuel tank inlet check valve (ICV) insufficient weld. Document # 933321, Fuel Tank Service Procedure, was issued to specific dealers in the states of Nevada, Florida and Texas in January 2007 in order to acquire exemplar sample fuel tank sections as requested in item No. 11 of this IR.

The communications are included on the Att_1_GM disk in the folder labeled Q_07; refer to the folder labeled, "Q_07_BULLETINS." The search for this information was completed on January 17, 2007. The preceding information was collected from GM Service Operations.

General Motors is not planning to issue in the next 120 days, any service, warranty or other technical documents or communications to its dealers, regional offices, zone offices or other entities regarding the subject condition in the subject vehicles.

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, GM. 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.

The information listed in Table 8-1 below is a summary of actions that have been conducted, are being conducted, are planned, or are being planned by or for GM regarding the subject condition on the subject vehicles as of February 14, 2007. Documents and additional supporting information are included in the Attachments as noted in the table.

Action 8-A: Stant Manufacturing Corporation (Stant) Inlet Check Valve (ICV); Design Failure Mode Effects Analysis (DFMEA), Manufacturing Process Failure Mode Effects Analysis (PFMEA), Design Validation Part Repeatability (DVP & R), and Products Control Plan (PCP). **Start Date:** 07/1997 **End Date:** 06/2003 **Engineering Group:** Stant Manufacturing Corporation **Attachments:** Documents can be found on the Att_4_Stant Confidential disk in the folder labeled Q_08, refer to the folder labeled, "Q_08_A Stant Documents." **Description:** DFMEA, PFMEA, DVP &R, and PCP for the Stant ICV installed in the subject vehicles. **Summary of Action:** Documents used in the component design, validation plan and manufacturing process.
Action 8-B: Inergy Automotive Systems (Inergy) Fuel Tank and ICV weld process Design Failure Mode Effects Analysis (DFMEA), Manufacturing Process Failure Mode Effects Analysis (PFMEA), Development Validation Process & Report (DVP & R), Knowledge Book –Hot Plate Welding, Fuel Tank Assembly Process Flow, and Control Plan Welding & Helium Leak Check. **Start Date:** 03/1997 **End Date**: 06/2004 **Engineering Group:** Inergy Automotive Systems **Attachments:** Documents can be found on the Att_3_Inergy Confidential disk in the folders labeled Q_08 and Q_09, refer to the files and folder labeled, "Q_08_B Inergy Tank DFMEA", "Q_08_B Inergy Tank PFMEA", "Q_09_D Inergy Tank DVP & R", "Q_08_B Inergy Knowledge Book Welding", "Q_08_B Inergy Tank Assm Process Flow", "Q_08_B Inergy Tank Control Plan-Leak Check". **Description:** DFMEA, PFMEA, DVP &R, ICV weld information, fuel tank assembly flow, and control plan/weld check related to the fuel tank and ICV installed in the subject vehicles. **Summary of Action:** Documents used in the component design, validation plan, manufacturing and weld process.
Action 8-C: GM chassis fuel storage and handling Statement of Requirements, specifications, and validation confirmation information regarding the fuel tank, fuel storage and handling system for the subject vehicles **Start Date:** 12/1996 **End Date:** 10/2003 **Engineering Group:** GM Engineering **Attachments**: Documents can be found on Att_2_GM Confidential disk in the folder labeled Q_08, refer to the files labeled, "Q_08_C GM DFMEA", "Q_08_C GM fuel storage & handling STS Template, "Q_08_C GM DFM-DFA", and the folders labeled Q_08_C GM Validation, Q_08_C GM SOR, and Q_08_GM VTS. **Description:** Chassis fuel storage and handling requirements for design, development and validation. Describes engineering processes, tasks, events, and deliverables required of the supplier to provide an integrated fuel tank assembly for the subject vehicles. **Summary of Action:** Design, performance and validation of the fuel storage and handling system defined and confirmed.

Action 8-D: Problem Resolution tracking System PRTS N130742 Tank Asm-Fuel (w/SDR) – Fuel Tank Asm

Start Date: 07/2002

End Date: 11/2002

Engineering Group: GM Engineering, GM Vehicle Warranty Engineering

Attachments: Documents can be found on Att_1_GM disk in the folder labeled Q_08, refer to the files in the folder labeled Q_08_D PRTS N130742.

Description: Following an Adjustable Moving Deformable Barrier to Stationary Vehicle Left Rear Impact Test, Stoddard solution was observed leaking from the fuel tank assembly on a prototype vehicle with a prototype fuel tank assembly manufactured on prototype tooling. The prototype fuel tank assembly was not used in production.

Summary of Action: Root cause identified as poor prototype quality weld. The solution was implemented into the Inergy Control Plan starting on page 8 of 15.

Action 8-E: ICV Work Group (WG)

Start Date: 12/2002

End Date: 05/2005

Engineering Group: GM Engineering, Inergy, Stant, Alfmeier Corporation

Attachments: Documents related to this action are being provided on the attachment disks and in the folders identified below;

Att_1_GM disk in the folder labeled Q_08, refer to the following folders and files in the folder labeled Q_08_E;

File/Folder Name	Description
ICV Recap	Presentation summary of initial dealer product reports used to initiate ICV WG
ICV Chronology	Chronology of ICV WG activity
ICV WG Status_Minutes	WG status/minutes/communications
WG parts ret matx sum (folder)	WG parts return matrices and summaries
WG warranty reviews (folder)	WG warranty reviews
WG presentations (folder)	Presentations made by the WG
12-2004 WG data summary	December 2004 WG data summary slides
Inergy WG ICV test reports (folder)	Test reports for WG test done by Inergy
WG ICV Shield	WG summary for GMT201 MY2005-07 implementation of ICV shield summary

Att_2_GM_Conf disk in the folder labeled Q_08, refer to the following folders and files in the folder labeled Q_08_E;

File/Folder Name	Description
RedX (folder)	RedX I, RedX II problem tree and reports
Alfmeier Testing (folder)	Validation Testing Reports Alfmeier ICV

Att_5_Alf_Conf disk in the folder labeled Q_08, refer to the following folder labeled Q_08_E Alf Controls;

File/Folder Name	Description
Alfmeier Documents	Alfmeier Corporation ICV DFMEA, PFMEA and Control Plan.

Description: When GM became aware of dealer reported ICV related fuel leaks the ICV work group was formed to investigate the reports, study the information, determine if an issue existed and if so identify effect on vehicle performance, root cause and if necessary a solution.

Summary of Action: Specific summary information regarding the work group activity is contained in the attached documents. Changes to the Stant ICV molding parameters, Inergy Weld Process Control Plan and a substitution of the Alfmeier ICV. The work group was unable to reach a consensus as to root cause determination. In May 2005, the assessment was that the warranty rate was low and that it should continue to be monitored.

Action 8-F: Fuel Tank Inlet Check Valve Insufficient Weld Product Safety Recall **Start Date:** 09/2003 **End Date:** 11/2003 **Engineering Group:** GM Engineering, Inergy Automotive **Attachments:** Documents can be found on Att_1_GM disk in the folder labeled Q_08, refer to the folder labeled Q_08_F Recall Bulletin and Att_2_GM Conf disk in the folder labeled Q_08, in the folder labeled Q_08_F FPE Report. **Description:** **Summary of Action:** This recall related to insufficient weld of the ICV, not cracking of the ICV.
Action 8-G: ICV Shield Development **Start Date:** 04/2004 **End Date:** 03/2006 **Engineering Group:** GM Engineering, Alfmeier Corporation **Attachments:** Documents can be found on Att_1_GM disk in the folder labeled Q_08, refer to the folder labeled Q_08_F Alfmeier Presentations and the Att_2_GM Conf disk in the folder labeled Q_08_F Alfmeier ICV EWOs **Description:** The ICV Work Group suggested implementation of a shield to protect the ICV from road debris based on the belief it was a contributor to ICV damage. Subsequent warranty reviews indicated road debris was not a significant contributor. **Summary of Action:** ICV shield development was unsuccessful.
Action 8-G: Investigation of the subject condition **Start Date:** 02/19/2007 **End Date:** TBD **Engineering Group:** GM Engineering, Inergy Automotive **Attachments:** None **Description:** GM continues to investigate the subject condition **Summary of Action:** Action not complete

9. **Describe the process used to join the inlet check valve tube to the fuel tank assembly, the fuel tank assembly to the filler tube, and the combined assemblies onto the vehicle. In this response please include any specifications or drawings that this joining process or joint must meet. Also include any quality assurance measures that are taken to inspect the joint or ensure that it will not leak. In addition, identify conditions in which movement can occur between the fuel tank assembly and the filler tube during vehicle operation.**

Hot Plate Welding is used to join the plastic inlet check valve to the plastic fuel tank assembly. This process is done by the supplier of the fuel tank assemblies at their plant in Ramos Mexico for the Aztek and Rendezvous vehicles and Andersen Indiana for the Venture, Montana and Silhouette vehicles.

The Hot Plate Welding is used to join two plastic parts together to obtain an integral joint. This process of Hot Plate Welding of plastic components consists of four phases. The Hot Plate Welding process uses temperature, pressure and dwell time to achieve proper bonding of the plastic parts.

The first phase is the MATCHING PHASE (1) which brings into contact the hot plate surface to the two parts to be joined together. This phase puts an initial melt on the surfaces to be welded. Both parts are held in a fixture with the hot plate in between the parts during this phase. This phase prepares the weld surfaces on the parts and makes them acceptable for the bonding process.

The second phase is the HEATING PHASE (2) which transfers the heat from the hot plate onto the two surfaces of the parts to be joined. Both parts are held in a fixture with the hot plate in between the parts during this phase. This heating phase creates a melt layer on both parts at a predetermined depth in order to allow the bonding of the parts in the created melt layer.

The third phase is the FUSION PHASE (3) in which the two parts are joined together and held under pressure and with a specified dwell time. The hot plate has been removed prior to this phase and the two parts are held together. This allows the parts to complete the welding process when the liquid melt area begins to solidify and form the solid state crystalline structure necessary for bonding.

The fourth phase is the COOLING PHASE (4) in which the weld area completely solidifies and stabilizes to form a correct bond under pressure joining the two parts. In this phase the two parts are still joined together and held under pressure with a specified dwell time. This applied pressure facilitates the blending of the material. The two part are then removed from the fixture is then removed and the process of joining the inlet check valve to the fuel tank assembly is complete.

Specifications and quality assurance measures regarding the weld process are included on the Att_3_Inergy Conf disk in the folder labeled Q_09; refer to the files and folder labeled, "Q_09_A Inergy Knowledge Book – Hot Plate Welding", "Q_09_B Inergy Tank Assembly Process Flow", "Q_09_C Inergy Control Plan Welding & Helium Leak Check", "Q_09_D_Inergy_DVP&R", and "Q_09_E Inergy Weld Component Strength Specification".

The completed fuel tank assemblies are placed in racks and shipped to the respective GM vehicle assembly plant where the fuel tank assembly and filler tube are installed into the vehicle then the joined together. The fuel tank assembly is placed onto the underbody and attached with two fuel tank straps and secured with two screws torqued to 47Nm +/- 1.3 Nm. The fuel tank canister is placed onto the underbody and attached to a welded stud and secured with one nut. The nut is torqued to 6.0 Nm +/- 1.0 Nm.

The filler pipe hose is placed onto the vehicle body and attached to two welded studs and secured with one nut on each stud. The nuts are torqued to 6 Nm +/- 2 Nm. The filler pipe bracket is placed onto the underbody and secured with a bolt. The bolt is torqued to 25Nm +/- 5 Nm. A lubricant is applied to the filler pipe hose. The filler pipe hose is joined to the inlet check valve by being fit over the inlet check valve and secured with a clamp that is torqued to 2.5 Nm +/- 0.5 Nm.

Drawings of the subject vehicle fuel tank assembly, fuel tank inlet check valve weld and filler pipe hose are contained on the Att_2_ GM Confidential disk in the folder labeled Q_09; refer to the folder labeled "Q_09_drawings". The GM Product Assembly Documents (PADs) for the fuel tank assembly, fill pipe and fill pipe clamp are contained on the Att_2_ GM Confidential disk in the folder labeled Q_09; refer to the folder labeled "Q_09_PAD". The fuel tank assembly and filler pipe are both attached to the same underbody part as detailed in the PAD documents, thus, there is minimal relative movement between the fill pipe and fuel tank.

Details of the GM specifications noted on the drawings that relate to the ICV weld joint and weld process are contained on the Att_2_ GM Confidential disk in the folder labeled Q_09; refer to the file labeled, "Q_09_H GM9322P Leak Test Criteria", "Q_09_I GM7473M Fuel Tank Material", and "Q_09_J GM9321P Internal Stress Cracking".

10. Describe all modifications or changes made by, or on behalf of GM, in the design, material composition, manufacturing, 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 identifiable by MY, date of build or VIN in the "PRODUCTION DATA" table of Request No. 1;
b. A detailed description of the modification or change;
c. The reason(s) for the modification or change;
d. The part numbers (service and engineering) of the original component;
e. The part number (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 GM is aware of which may be incorporated into vehicle production within the next 120 days.

GM is providing a summary of the product engineering information requested in 10(a-h), along with copies of the related Engineering Work Order (EWO) documents on the Att_1_GM disk in the folder labeled Q_10; refer to the files labeled, "Q_10_A Modifications" and on the Att_2_GM_Conf disk in the folder labeled Q_10; refer to the files labeled, "Q_10_B_ASGDW", "Q_10_C_ASHHG" and "Q_10_D_AKTCF". Reference Action 8-D included in response to item 8 for the responsive information regarding a change in the Inergy Quality Control Plan.

GM is not planning to incorporate any modifications or changes into production of the subject vehicles that relate to the alleged defect within the next 120 days.

11. **Produce one each of the following:**

a. **Exemplar sample section of each design version of the subject component that includes the inlet check valve and its adjacent interfaces (please do not sent the entire fuel tank/filler tube assembly);**
b. **Field return sample section (or photographs) of the subject component exhibiting the subject failure mode that includes the inlet check valve and its adjacent interfaces; and**
c. **One quarter-sectioned sample of the subject component that includes the inlet check valve, filler tube and a small portion of the main fuel tank. This section should be cut through the centerline of the items.**

There are 3 design versions of the requested subject vehicle component. One version is the subject component installed in the subject vehicles produced between the 2001 MY start of production and July 2003. A second version was installed in the subject vehicles produced between July 2003 and December 2003.

These two versions are no longer produced and the supplier was unable to provide exemplar samples. GM initiated a parts return program upon receipt of this IR for the purpose of acquiring exemplar samples of these two versions. To date no parts have been returned. GM will supply these versions of the requested subject component as soon as they become available.

The third version of the subject component was installed in the subject vehicles produced after December 2003 and has not changed to date. Enclosure 11 contains two exemplar samples of this design version of the subject component installed in the subject vehicles.

12. **State the number of subject components that GM has sold that may be used in the subject vehicles by component name, part number (both service and engineering/production), model and model year of the vehicle in which it is used and month/year of sale (including the cutoff date for sales, if applicable). For each component part number, provide the supplier's name, address, and appropriate point of contact (name, title, and telephone number). Also identify the make, model and model year of all other vehicles of which GM is aware that contain the identical component, whether installed in production or in service, and state the applicable dates of production or service usage.**

An electronic summary table of the requested service part information for the subject components is provided on the Att_1_ CD, GM disk in the folder labeled Q_12; refer to the Microsoft Excel file labeled, "Q_12_Part Sales". GM does not offer any kits that have been released or developed for use in service repairs specifically related to the subject condition.

These sales numbers represent sales to dealers in the US and Canada. This data has limited analytical value in analyzing the field performance of a motor vehicle component because the records do not contain sufficient information to establish the reason for the part sale. It is not possible from this data to determine the number of these parts that have been installed in the subject vehicles or the number remaining in dealer or replacement part supplier inventory.

This table contains service part numbers, part description, part usage information including the GM vehicles that contain the identical component, part sales figures by month and calendar year, and the supplier's name and address, contact name and phone number.

13 Furnish GM's assessment of the alleged defect in the subject vehicle, 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.

The design and process failure mechanisms and failure modes for the fuel tank assembly installed in the subject vehicles are contained on the Att_3_ Inergy Confidential disk in the folder labeled Q_08; refer to the files labeled, "Q_08_B Inergy Tank DFMEA" and "Q_08_B Inergy Tank PFMEA".

The design and process failure mechanisms and failure modes for the Inlet Check Valve (ICV) installed in the subject vehicles are contained on the Att_4_Stant Confidential disk in the folder labeled Q_08, refer to the files labeled, "Q_08_A Stant ICV DFMEA" and "Q_08_A Stant ICV PFMEA".

Failure modes for the welding process of the inlet check valve to the fuel tank assembly are detailed on pages 15–18 of the confidential Inergy Knowledge Book – Hot Plate Welding document provided in response to item No. 8 above.

The housing of the Stant ICV was manufactured with High Density Polyethylene (HDPE) material containing 18% carbon black. In laboratory testing, some of these ICVs exhibit sensitivity to the combination of manufacturing variations and the energy inputs detailed below.

Fuel tank geometry and/or variation in fuel tank thickness/stiffness, positioning of the ICV to the weld pad during manufacturing can contribute to the effects of stress loads. Based on the results of RedX I and II analyses and analysis of field return parts, it appeared that variations in ICV molding parameters resulted in differences between cracked and non-cracked parts retrieved from different manufacturing periods. Some of the parts showed smooth melt flow lines, smaller and fewer inclusions and no cracks. Other parts showed poor melt flow lines and numerous inclusions with cracks.

Energy inputs such as fuel movement within the fuel tank, fuel tank pressure fluctuations and flex, road vibration inputs, high ambient and operating temperatures and temperature fluctuations, induce stress loads onto the ICV housing. The RedX II analysis included a probe test with extreme input parameters combined to create unrealistically severe operating conditions. The test was used to assess variation of ICV housing performance in a fuel tank assembly. Repeated applied stress loads resulted in some

fatigue failures of the ICV housings. It is unknown how the probe test correlates to the energy input profiles in the field.

A fracture can begin as a small opening and over time a potential leak path for vapors or liquid fuel may exist. Fuel vapors could pass through a 0.005" opening and the vehicle operator may notice a fuel odor. The service engine soon diagnostic is capable of detecting a 0.020" effective opening. Continued use of the vehicle may cause the opening to propagate to over 0.040" which may allow droplets of fuel to accumulate on the side of the fuel tank as it passes over the fracture opening during refueling or certain driving maneuvers.

There are warnings and indicators that the condition may be occurring. ICV is located on the left side of the fuel tank, approximately mid-level with full fuel capacity. If the ICV housing has cracked at the tank and the fuel level is below the crack, some liquid fuel may splash through the opening onto the side of the tank and possibly onto the ground. The rate of fuel slosh or movement through the opening is dependent on the size of the crack, the conditions under which the vehicle is driven, and the fuel level. Under these conditions the Service Engine Soon (SES) light may activate and the operator may detect fuel odor. Liquid fuel movement through the opening created by the crack will cease when the vehicle is stationary.

If the crack in the ICV occurs while the fuel level is above the opening, liquid fuel may leak from the opening onto the side of the tank and subsequently onto the ground. The rate of leakage may initially vary from slight seepage to constant drip, and is dependant on the actual size of the opening. Continued vehicle operation following the initial stages of ICV cracking may continue to propagate the opening.

The fuel tank is located on the driver's side of the vehicles and the ICV is located on the outboard side of the fuel tank. The exhaust system is on the passenger's side of the vehicle. There are no vehicle ignition sources near the ICV.

GM believes that twenty of the VOQ reports submitted with this inquiry may relate to the subject condition. In eleven of the VOQ reports, the customer reported a fuel odor or illumination of the SES light. GM has not examined the fuel tanks that are the subject of the reports; therefore, GM has not identified the specific contributory factors related to each of the reported incidents.

GM's analysis of the warranty claims for fuel leakage and/or odor originating from the area of the inlet check valve filler pipe/fuel tank interface indicates a 4.42 IPTV at 36 months of service. The number of incident reports relative to the subject vehicle population is low and there have been no reported crashes, injuries or fatalities.

General Motors continues to investigate the subject condition.

* * *

GM claims that certain information, in documents that are part of lawsuit and claims files maintained by the GM Legal Staff, is attorney work product and/or privileged. That information includes notes, memos, reports, photographs, and evaluations by attorneys (and by consultants, claims analysts, investigators, and engineers working at the request of attorneys). GM is producing responsive documents from claims files that are neither attorney work product nor privileged, and withholding those that are attorney work product and/or privileged.

This response is based on searches of General Motors Corporation (GM) locations where documents determined to be responsive to your request would ordinarily be found. As a result, the scope of this search did not include, nor could it reasonably include, "all of its divisions, subsidiaries (whether or not incorporated) and affiliated enterprises and all of their headquarters, regional, zone and other offices and their employees, and all agents, contractors, consultants, attorneys and law firms and other persons engaged directly or

indirectly (e.g., employee of a consultant) by or under the control of GM (including all business units and persons previously referred to), who are or, in or after September 1, 2000, were involved in any way with any of the following related to the alleged defect in the subject vehicles:

a. Design, engineering, analysis, modification or production (e.g. quality control);
b. Testing, assessment or evaluation;
c. Consideration, or recognition of potential or actual defects, reporting, record-keeping and information management, (e.g., complaints, field reports, warranty information, part sales), analysis, claims, or lawsuits; or
d. Communication to, from or intended for zone representatives, fleets, dealers, or other field locations, including but not limited to people who have the capacity to obtain information from dealers."

This response was compiled and prepared by this office upon review of the documents produced by various GM locations, and does not include documents generated or received at those GM locations subsequent to their searches.

General Motors requested assistance and documents from suppliers in responding to items 8, 9, 10, and 11 and this response includes those documents received from suppliers.

Please contact me if you require further information about this response or the nature or scope of our searches.

Sincerely,

Gay P. Kent
Director
Product Investigations

Attachments

N060230
RQ06-009

GM CONFIDENTIALITY LETTER

GM CONFIDENTIALITY LETTER
HAS BEEN REMOVED FROM THIS
ATTACHMENT AND SUPPLIED TO
THE OFFICE OF THE CHIEF COUNSEL

N060230
RQ06-009

SUPPLIER CONFIDENTIAL LETTER

SUPPLIER CONFIDENTIAL LETTER
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N060230
RQ06-009

ATTACHMENT "1"

GM NON-CONFIDENTIAL MATERIAL

N060230
RQ06-009

ATTACHMENT "2"

GM CONFIDENTIAL MATERIAL

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N060230
RQ06-009

ATTACHMENT "3"

INERGY AUTOMOTIVE

CONFIDENTIAL MATERIAL

INERGY AUTOMOTIVE
CONFIDENTIAL MATERIAL
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N060230
RQ06-009

ATTACHMENT "4"

STANT MANUFACTURING

CONFIDENTIAL MATERIAL

STANT MANUFACTURING
CONFIDENTIAL MATERIAL
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ATTACHMENT "5"

ALFMEIER CORPORATION

CONFIDENTIAL MATERIAL

ALFMEIER CORPORATION
CONFIDENTIAL MATERIAL
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