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2004 MAR -8 P 12:01
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March 4, 2004
REF. NO.: GA04-009

Mr. Thomas Z. Cooper, Chief
Vehicle Integrity Division
Office of Defects Investigation, NVS-212pco
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, DC 20590

RE: NVS-214pco/PE04-002 Subaru WRX

Dear Mr. Cooper:

This letter responds to the Agency's Preliminary Evaluation (PE04-002) of allegations of fuel line leakage in engine compartment in MY 2002 Subaru Impreza WRX vehicles.

As requested in your letter, our response in duplicate, is provided after repeating the applicable request verbatim, which is in bold test.

1. **State, by model and model year, the number of subject vehicles Subaru has manufactured for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by Subaru, 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." See Enclosure 1, Data Collection Disc, for a pre-formatted table that provides further details regarding this submission.

RESPONSE 1:
Subaru has manufactured the following numbers of Impreza WRX vehicles with engine numbers prior to 873467 for sale or lease in the U.S.:

Model Year	Quantity
2002	35,306
2003	6,805
Total Vehicles	42,111

This information was obtained on February 19, 2004 from Subaru's parent company, Fuji Heavy Industries, Ltd., which actually manufactures these vehicles in Japan.

Enclosed is an Access file ("wrx_extract.mdb") with the requested information by individual VIN.

2. State the number of each of the following, received by Subaru, or of which Subaru are 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. Reports involving a fire, 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;
e. Property damage claims;
f. Third –party arbitration proceedings where Subaru is or was a party to the arbitration; and
g. Lawsuits, both pending and closed, in which Subaru is or was a defendant or codefendant.

For subparts "a" through "e" 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).

In addition, for items "c" through "g" provide a summary description of the alleged problem and causal and contributing factors and Subaru's assessment of the problem, with a summary of the significant underlying facts and evidence. For items "f" and "g," 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.

Response 2:
This information was gathered from current internal files and databases by several departments within Subaru during the week of February 4, 2004.

a. Consumer complaints:	84
b. Field reports:	68
c. Reports including a crash:	0
injury:	0
death:	0
d. Reports involving a fire:	0
e. Property damage claims:	0
f.. Third party arbitration proceedings:	0
g. Lawsuits:	0

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. **Subaru'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;**
   h. **Report or claim date;**
   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; and**
   m. **Number of alleged fatalities, if any.**

Provide this information in Microsoft Access 2000, or a compatible format, entitled "REQUEST NUMBER TWO DATA." See Enclosure 1, Data Collection Disc, for a pre-formatted table that provides further details regarding this submission.

Response 3:
The information for a. – m. is provided in the enclosed Access file ("tblQuestionTwoData"). Information gathered as in Request #2 above.

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 Subaru used for organizing the documents.

Response 4:
Enclosed are the requested documents. They are in sequence, first, by the category, and, second, by the Subaru identification number found in column 2 of the Access file provided in the response to Request #3.

5. State, by model and model year, a total count for all of the following categories of claims, collectively, that have been paid by Subaru 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. Subaru'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'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." See Enclosure 1, Data Collection Disc, for a pre-formatted table that provides further details regarding this submission.

Response 5:
These data are provided by Subaru's Customer Dealer Services Dept. and included warranty claim data finalized through February 20, 2004. Please see the enclosed Access file ("warranty_data.").

Claim Category	Subaru WRX Model Year 2002	Subaru WRX Model Year 2003	
Warranty claims	472	15	
Extended warranty claims ("SAS")	21	0	
Goodwill claims	33	0	
Field adjustments	0	0	
Total claims			487

6. Describe in detail the search criteria used by Subaru 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 Subaru 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 Subaru 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 6:
Subaru used Fail Codes DET, DEU, KYC and KZC and part numbers 17544AA134 and 807707140 to select applicable claims. The following is a description of the specific fail codes and part numbers returned based on the selected criteria.

Problem Code	Fail Code Description	Trouble Code Description
DET-02	Fuel Injector Delivery Hose	Cracked
DET-03	Fuel Injector Delivery Hose	Split/poor fit
DET-08	Fuel Injector Delivery Hose	Chipped
DET-22	Fuel Injector Delivery Hose	Blocked/clogged
DET-23	Fuel Injector Delivery Hose	Loose
DET-25	Fuel Injector Delivery Hose	Noisy
DET-29	Fuel Injector Delivery Hose	Improper contact/seating
DET-37	Fuel Injector Delivery Hose	Leaking fuel
DET-48	Fuel Injector Delivery Hose	Modification
DET-88	Fuel Injector Delivery Hose	Blocked, clogged
DEU-02	Fuel Injector Delivery Pipe	Cracked
DEU-03	Fuel Injector Delivery Pipe	Split/poor fit
DEU-12	Fuel Injector Delivery Pipe	Scored/scratched
DEU-23	Fuel Injector Delivery Pipe	Loose
DEU-27	Fuel Injector Delivery Pipe	Improperly cast/drilled
DEU-28	Fuel Injector Delivery Pipe	Porous casting
DEU-29	Fuel Injector Delivery Pipe	Improper contact/seating
DEU-34	Fuel Injector Delivery Pipe	Leaking oil or grease
DEU-36	Fuel Injector Delivery Pipe	Leaking exhaust or air

DEU-37	Fuel Injector Delivery Pipe	Leaking fuel
DEU-42	Fuel Injector Delivery Pipe	Output incorrect
DEU-48	Fuel Injector Delivery Pipe	Modification
KYC-00	Fuel Odor	Concern not duplicated
KYC-85	Fuel Odor	Concern duplicated-normal
KZC-00	Fuel Odor	Concern not duplicated
KZC-85	Fuel Odor	Concern duplicated-normal

Part Number	Part Number Description
17544AA134	Fuel Delivery/Return Pipe
807707140	Hose

The 2002 and 2003 Subaru WRX models have the following warranty coverages:

Warranty	Years Limitation	Mileage Limitation
New Car Warranty	3	36,000
Seat Belt Warranty*	Useful Life of Vehicle	Unlimited.
Powertrain Warranty*	5	60,000
Rust Perforation Warranty*	5	Unlimited.
Parts and Accessories*	1	Unlimited.

*not applicable to the alleged defect.

The only optional coverage offered by Subaru are extended service contract plans under the Subaru Added Security (SAS) Program. There are two general plan categories: "Classic" and "Gold Plus". Within each category, there are 3 possible deductibles ($100, $50, $0) and eight (8) possible plan year/mileage terms (3/45,000; 4/60,000; 5/60,000; 6/60,000; 6/80,000; 5/100,000; 6/100,000; 7/100,000). This yields 24 possible plans.

"Classic plans cover nearly 1000 parts in all major component areas, including engine, transmission, drive trains, front suspension, steering, brakes, electrical, cooling and fuel systems and air conditioning. Also provides towing and rental car reimbursement for covered repairs."

"Gold Plus plans include all Classic plan coverage plus hundreds more parts. In fact they provide essentially the same "bumper-to-bumper" coverage as the basic factory warranty. Only a few maintenance items and body parts are not covered. The Gold Plus plan also reimburses for lodging and meals when a breakdown interrupts your out-of-town travel, plus: 24-hour emergency roadside assistance, $100 allowance for "Sign & Drive" dispatched towing, jump start, tire change, gasoline delivery, locksmith service, road hazard tire protection, computerized trip routing, dealer locator service and travel assistance."

As of February 24, 2004, Subaru Added Security had the following active contracts:

	2002MY	2003MY*
36 Mo. /36,000 Miles	4	1
36 Mo. /45,000 Miles	642	176

48 Mo. /48,000 Miles	9	1
48 Mo. /60,000 Miles	532	91
48 Mo. /80,000 Miles	14	0
60 Mo. /60,000 Miles	1,157	377
60 Mo. /80,000 Miles	35	2
60 Mo. /100,000 Miles	998	268
72 Mo. /60,000 Miles	1,442	409
72 Mo. /80,000 Miles	2,342	605
72 Mo. /100,000 Miles	928	221
84 Mo. /100,000 Miles	785	214
	8,867	2,359

7. Produce copies of all service, warranty, and other documents that relate to, the alleged defect in the subject vehicles, that Subaru 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 Subaru is planning to issue within the next 120 days.

Response 7:
We have attached a copy of our Service Bulletin Number 09-36-03 dated 04/01/03 as Appendix 7 which addresses the Fuel Smell in Cold Weather. No other documents have been issued.

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, Subaru. 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 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.

Response 8:
In April 2002, Subaru of America, Inc. ["SOA"] received owner reports of fuel odor after cold start on Impreza WRX vehicles. SOA asked Fuji Heavy Industries Ltd. ["FHI"], the vehicle manufacturer, for assistance in identifying the cause of this odor. Intake manifold assemblies were collected from vehicles that had experienced this phenomenon. FHI tested the returned parts and found that a very slight amount of fuel could seep for a very short time after cold start when the following two conditions existed simultaneously:

The two fuel delivery pipes were sufficiently misaligned and the engine was cold-started under extremely low ambient temperatures.

[One of the consumer complaints forwarded by NHTSA refers to fuel odor at other than extremely low ambient temperatures. Subaru believes that this is an isolated case not related to the subject phenomenon. (SOA records indicate that this vehicle had undergone repair of its evaporative control system prior to the NHTSA complaint, and that the engine had been extensively modified.)]

Action Information:

a. Fuel seepage during cold start of engine in extremely low ambient temperatures
b. July 26, 2002: Specific Safety Meeting [see Appendix 8b1 – minutes and handout]
c. September 2, 2002: Recall Committee Meeting [see Appendix 8c – minutes and handout]
d. Since there were customer claims that drivers experienced fuel odor during cold start of engine, meetings were held to clarify the cause and to discuss any possible safety impact. (see above)
e. FHI Quality Assurance Department
f. FHI tested the returned parts and found that a very slight amount of fuel could seep for a very short time after cold start when the following two conditions existed simultaneously:

   The two fuel delivery pipes were sufficiently misaligned and the engine was cold-started under extremely low ambient temperatures.

   The tests revealed the following:

   At an ambient temperature of –4 degrees F (-20 degrees C), the engine coolant temperature will increase to 14 degrees F (-10 degrees C) within 140 seconds of engine start, at which temperature, fuel seepage will cease, although the odor may continue to be experienced for some time. Although the fuel odor is noticeable, the amount of fuel seepage is very small (0.11cc). [see Appendix 8f1 – Measured Data of Fuel Seepage Amount]

   In a laboratory test to determine maximum fuel vapor density in the engine compartment at the time of fuel seepage (0.18cc was introduced), a fuel vapor density of 20.3ppmC_6 was measured. Although fuel odor can be detected at this level, combustion is not possible, since the flammable range of gasoline is from 14,000 to 76,000 ppmC_6 [see Appendix 8f2 – Measured Data of Fuel Vapor Density].

As a result of its investigation, FHI judged that this phenomenon does not constitute a defect that relates to motor vehicle safety and that no field corrective action would be necessary in the field.

On the engine production line (beginning August 5, 2002, with engine number 673467) the delivery line fuel hose was lengthened from 64mm to 94mm and the metal fuel delivery pipe was shortened by 30mm to prevent fuel seepage caused by misaligned fuel pipes.

A service bulletin was later issued instructing Subaru dealers to repair vehicles whose owners complained of a fuel odor during engine start by replacing the metal fuel pipes and fuel hose with redesigned parts (as described above).

Although not covered by your request, an Emissions Defect Information Report ["EDIR"] was submitted on March 11, 2003, to the U.S. Environmental Protection Agency ["EPA"] and the California Air Resources Board ["CARB"] concerning this fuel seepage issue in accordance with their emissions defect reporting regulations. (The interest of EPA and CARB is the evaporative emissions aspect of the fuel seepage. No further action was required.)

9. Describe all modifications or changes made by, or on behalf of, Subaru 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 (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 Subaru is aware of which may be incorporated into vehicle production within the next 120 days.

Response 9:

a. The change described in Response 8f. above was incorporated beginning September 13, 2002, on the 2003 model year vehicle production line beginning with the following VINs:
   Sedan: 3*506193 Wagon: 3*806971
b. The delivery line fuel hose was lengthened from 64mm to 94mm and the metal fuel pipe was shortened by 30mm to prevent fuel seepage caused by misaligned fuel pipes.
c. The change was made to improve the fit of the fuel hose with the metal fuel pipes.
d. The part numbers of the original pipe and hose (production and service) are:
   Pipe complete 17544AA133 (the delivery and return pipes are welded together, although only the delivery pipe dimension is changed)
   Hose 807707130
e. The part numbers of the modified pipe and hose (production and service) are:
   Pipe complete 17544AA134 (30mm shorter than the original one) (the delivery and return pipes are welded together, although only the delivery pipe dimension is changed)
   Hose 807707140 (30mm longer than the original one)

f. The original pipe complete and hose were no longer used in production effective September 13, 2002, beginning with VIN 3*506193 for the Sedan and 3*806971 for the Wagon.

According to SOA parts records –

only 9 original pipe complete parts (part number 17544AA133) were ever sold as service parts, and none were in inventory at the time the modified parts became available; and,

The original and so-called modified hoses were used on vehicles other than the subject vehicles as early as 1986, it is not possible to determine which hoses were used on which vehicles in the field.

g. The modified pipe complete and hose were available to SOA for order as service parts on December 9, 2002.

h. The modified parts are interchangeable with the original parts only as a set. Therefore, both the modified pipe complete and hose must be replaced at the same time.

No other changes are anticipated.

10. Produce two of each of the following:

a. Exemplar samples of each design version of the subject component;

b. Field return samples of the subject component exhibiting the subject failure mode; and
c. Any kits that have been released, or developed, by Subaru for use in service repairs to the subject component/assembly which relate, or may relate, to the alleged defect in the subject vehicles.

Response 10:
Under separate cover, we have provided:

a. Exemplar sample of the modified design version of the fuel pipe complete (part number 17544AA134). Since no new original fuel pipe complete (part number 17544AA133) are available in the USA or in Japan, we ask that you accept the actual returned field sample pipe (10b.) as the exemplar original part.
b. An actual field returned sample of the original pipe complete and hose that was replaced due to the fuel seepage in cold weather.
c. No kit was established for use in repairs for the fuel seepage in cold weather.

11. State the number of each of the following that Subaru 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 cut-off date for sales, if applicable):

a. Subject component; and
b. Any kits that have been released, or developed, by Subaru for use in service repairs to the subject component/assembly.

For each component part number, provide the supplier's name, address, and appropriate point of contact (name, title, and telephone number). Also identify by make, model and model year, any other vehicles of which Subaru is aware that contain the identical component, whether installed in production or in service, and state the applicable dates or production or service usage.

Response 11:
a. We have provided the parts demand history in Appendix 11a.
b. No parts repair kits were developed for this issue.

The parts suppliers names are:

Pipe Complete
SANOH INDUSTRIAL CO., LTD.
758 Konosu, Koga-Shi, Ibaraki-Ken 306-0041 Japan
Mr. Kazuo Furuyama, General Manager
General Quality Assurance Div.
Phone: (0280) 48-1357

Hose
MITOYO CORPORATION
4119-2 Oosza-Akabori, Oora-Machi, Oora-Gun, Gunma-Ken 370-0614 Japan
Mr. Masayuki Yamanaka, Manager
Quality Control group, Quality Assurance Dept.
Phone: (0276) 70-2718

12. Furnish Subaru'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), including why this is an exclusively a extreme cold weather issue;
d. The risk to motor vehicle safety that it poses, including potential hot surfaces/ignition sources in a 12 inch lateral radius from leakage point and vertically downward;
e. What warning, 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 12:

a. The fuel odor reported by consumers is caused by fuel seepage during cold start of the engine under extremely cold temperatures.
b. The failure mechanisms of the fuel seepage are the misaligned angle between two fuel delivery lines, which resulted in such fuel seepage during the first few seconds of cold engine start under these cold temperatures, caused by the stiffness of the hose connecting the two metal fuel lines. The extreme cold caused the hose to become too stiff to conform to the misaligned metal fuel lines, resulting in the seepage. As the underhood temperature increased, the hose became sufficiently pliable to properly align to the position of the pipes, stopping the seepage.
c. The failure mode is the inability of the stiff hose (caused by low underhood temperatures) to conform to the metal fuel pipes due to the misalignment (see Response 12. a. and b. above).
d. As has been discussed in Response 8 above, because the total amount of possible fuel seepage is extremely small (0.11cc or less), the concentration is well below that required for combustion, and seepage ends after no more than 140 seconds after engine start, due to the effect of the rapid increase in localized underhood temperatures on the pliability of the hose (not to mention that the only ignition sources are 250mm or more from the seepage location), although some fuel odor may be experienced for a short period of time, we believe that the subject condition poses no unreasonable risk to motor vehicle safety.
e. Drivers and passengers are alerted to fuel seepage by the fuel odor.
f. The following reports are attached:

Appendix 7	Copy of Service Bulletin Number 09-36-03
Appendix 8b1	Minutes of Specific Safety Meeting on 07/26/2002
Appendix 8b2	Minutes of Sectional Safety Meeting on 08/30/2002
Appendix 8c	Minutes of Recall Committee Meeting on 09/02/2002
Appendix 8f1	Measurement Data of Amount of Fuel Seepage
Appendix 8f2	Measurement Data of Fuel Vapor Density in Engine Compartment
Appendix 11a	Parts Demand History

Appendix 8b1, 8b2, 8c, 8f1 and 8f2 contain confidential information and have been submitted to the Office of Chief Counsel.

Should you have any questions regarding this response, please contact me at (856) 488-8644 or Gerald Plante at (856) 488-3226.

Sincerely,
SUBARU OF AMERICA, INC.

Don Bearden, Director
Governmental Affairs Department

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Enclosures