January 25, 2024

VIA EMAIL

Sharon Yukevich, Chief
Vehicle Defects Division – A National Highway
Traffic Safety Administration
1200 New Jersey Ave., SE
Washington, DC 20590

G243269

NEF-101sah
PE22-023

Subject: <u>General Motors LLC's Responses to NHTSA's Dec 12, 2023 Information Request in Investigation PE23-022</u>

Dear Ms. Yukevich:

This letter contains General Motors LLC's ("**GM**") responses (the "**Responses**") to the information requests in your December 12, 2023, letter (the "**Requests**") relating to National Highway Traffic Safety Administration ("**NHTSA**") Preliminary Evaluation PE22-023, which is a NHTSA investigation of alleged "malfunction[s] of the battery energy control module (BECM)" in MY2016-2019 Chevrolet Volt vehicles (as defined in the Requests, the "**Subject Vehicles**") that can "resul[t] in a loss of motive power." The Responses included in this letter address Requests 1-9 and 11-14 with a partial response to Request 10. GM requested and was granted an extension to supplement this letter with a full response to Request 10 by February 12, 2024. Unless otherwise defined herein, GM's Responses rely on the defined terms in the Requests.

PRELIMINARY STATEMENT

GM objects to the definition of "Alleged Defect," which does not accurately describe how the Subject Vehicles are designed to perform in response to certain fault conditions in the battery energy control module ("**BECM**," or as defined in the Requests, the "**Subject Component**").[1] A fault or malfunction in the Subject Component does <u>not</u> result in a stall, *i.e.*, a "loss of motive power" (as defined in the Requests, the "**Alleged Defect**"); rather, a fault in the Subject Component, if it occurs while the vehicle is being operated, may result in <u>reduced</u> propulsion while driving. This response is a designed-in, fail-safe mode that intentionally limits vehicle speed and acceleration. GM's Owner's Manual for the Subject Vehicles informs the customer of this potential condition. Additionally, the driver is informed of the reduced power with a malfunction indicator lamp ("**MIL**"), as well as a "PROPULSION POWER IS REDUCED" message on the vehicle's Driver Information Center ("**DIC**").

[1] The Subject Component is also referred to as the Voltage Current Temperature Module ("VITM").

If a malfunction in the Subject Component occurs while in a key off state, it will result in a no charge and no start condition, with a MIL and a reduced propulsion message on the DIC at key on. If a malfunction in the Subject Component occurs while charging, it will result in suspending charging and a no start condition, with a MIL and a reduced propulsion message on the DIC at key on. See figure P-1 below for effect of condition based on the vehicle state.

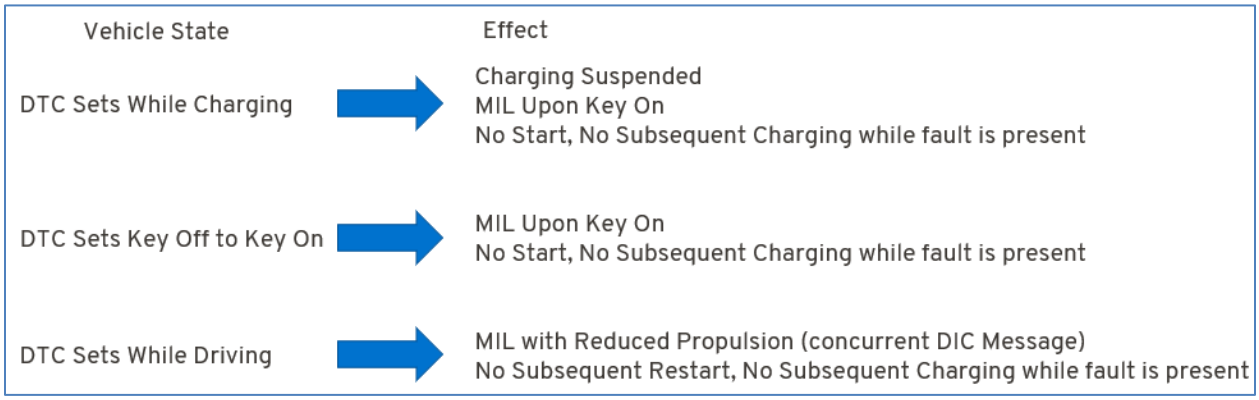

FIGURE P-1: EFFECT OF CONDITION

GM prepared its Responses by: (i) identifying, in consultation with the appropriate GM business personnel, the primary electronic databases and document repositories in GM's custody and control that store potentially responsive documents and information in the ordinary course of business, as more fully identified in the Responses below; and (ii) conducting a reasonable search, as appropriate, of these databases and document repositories for responsive documents and information. GM objects to the definitions of "document" and "GM" in the Requests as overbroad, unreasonably burdensome, and not reasonably tailored to records that might be expected to bear relevant and responsive information. GM's document production does not contain: (i) attorney-client privileged information or information protected as attorney-work product; and (ii) documents generated or archived in these locations after the dates that GM conducted its final searches. GM construes the Information Request as pertaining to vehicles manufactured for sale in the United States and its territories.

GM's document production is contained in the folder titled G243269_1_GM. Certain portions of these documents are exempt from public disclosure under the Freedom of Information Act (5 U.S.C. § 552(b)(4)) ("**FOIA**") and 49 CFR part 512, and have been redacted in the copy contained in the folder. GM has submitted the unredacted nonpublic copy of its document production (in the folder titled G243269_2_GM_CONF) to the NHTSA Office of Chief Counsel under 49 C.F.R. part 512.

Some of the documents in GM's production contain personally identifiable information ("**PII**") (e.g., vehicle registration information or VIN, employee names, and customer/employee contact information). GM today submits documents with unredacted PII with the understanding that NHTSA (or GM, if NHTSA prefers) will redact any PII before disclosing these documents to the public.

REQUESTS AND RESPONSES

REQUEST 1:

State, by model and model year, the 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. Vehicle identification number (17-character VIN);
b. Make;
c. Model;
d. Model Year;
e. Subject component part number and design version installed as original equipment;
f. Date of manufacture (MM/DD/YYYY);
g. Date warranty coverage commenced (MM/DD/YYYY); and
h. The State in the United States where the vehicle was originally sold or leased or delivered for sale or lease (postal abbreviation).

Provide the table in Microsoft Access 2010, or a compatible format, entitled "PRODUCTION DATA." A pre-formatted data collection file, which provides further details regarding this submission, will be provided to you.

GM RESPONSE:

Table 1-1 summarizes the number of Subject Vehicles that GM has manufactured for sale or lease in the United States by model year.

MAKE	MODEL	2016	2017	2018	2019	TOTAL
Chevrolet	Volt	8,942	37,727	20,739	5516	72,924

TABLE 1-1: SUBJECT VEHICLES

GM has produced the information requested in subparts (a) through (h) in the G243269_1_GM folder in the subfolder labeled "Q_01". Refer to the Microsoft Access 2010 file labeled "Q_01_PRODUCTION DATA."

REQUEST 2:

State 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, injury or fatality;
d. Property damage claims;

e. Third-party arbitration proceedings, both pending and closed, 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 "f," 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 "f," provide a summary description of the alleged problem and causal and contributing factors and GM'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 initiating the action was filed.

GM RESPONSE:

In response to subparts (a) through (f) for the Subject Vehicles, GM provides the following tables, which GM prepared by conducting a reasonable keyword search for potentially responsive claims in several databases[2].

Type of Report	*GM Reports*	*Num with Property Damage*	*Num with Crash*	*Num with Fire*	*Num with Injuries*	*Num with fatalities*
Owner Reports	*654*	*0*	*0*	*0*	*0*	*0*
Field Reports	*1412*	*0*	*0*	*0*	*0*	*0*
Third Party Arbitration Proceedings	*0*	*0*	*0*	*0*	*0*	*0*
Product Liability Lawsuits	*1*	*0*	*0*	*0*	*0*	*0*
Total Reports (Including Duplicates)	*2067*	*0*	*0*	*0*	*0*	*0*
Total Vehicles with Reports (Unique VIN)	***1909***	***0***	***0***	***0***	***0***	***0***

TABLE 2-1: SUMMARY OF CLAIMS RESPONSIVE TO REQUEST 2A-2F FOR THE SUBJECT VEHICLES

As summarized in Table 2-1, GM is aware of 1909 unique claims involving the Subject Vehicles that may be responsive to Request 2. In determining the responsiveness of a claim, GM erred on the side of coding the claim as responsive, even if the evidence in GM's possession linking the claim to the Alleged Defect was implausible, inconclusive, or circumstantial. Accordingly, the claim totals in Table 2-1 are conservative.

[2] These databases include: Customer Assistance Center (CAC), Product Assistance Center (PAC), Business Resource Center (BRC), Technical Assistance Center (TAC), Field Information Network Database (FIND), COMPASS, Field Product Report Database (FPRD) and GM Legal records.

In response to subparts "c" and "d," GM is not aware of any relevant incidents involving a crash, injury, fatality, or property damage claim. In response to subparts "f" and "g," GM is producing the responsive, nonprivileged litigation records relating to the litigation cases listed above in Table 2-1 in the G243269_1_GM folder in the subfolder labeled "Q_03". These records contain the requested information regarding 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.

VOQ Analysis

In addition to the data in Request 2, GM analyzed the 61 VOQs included with the PE23-022 Information Request. 48 of the 61 VOQs appear to be linked to the Alleged Defect insofar as they mention the Subject Component in the claim and/or the vehicle has a warranty claim for the replacement of the Subject Component. No VOQs mention any accidents or injuries associated with the Alleged Defect. 19 VOQs focused only on a repair delay; supply of the Subject Component was limited due to a chip shortage, demands for Volt service, Bolt production and a Chevrolet Bolt safety recall (21V560). These supply constraints and repair times have significantly improved. GM is conservative in including these 19 claims in the VOQ analysis as categorized, but they are not complaints of concern associated with the Alleged Defect. 29 VOQs had a recorded BECM replacement in warranty.

Please see GM's analysis of these reports in the G243269_1_GM folder in the Q_02 subfolder.

REQUEST 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), email address and telephone number (please use distinct fields for each data type);
d. Vehicle owner or fleet street address, city, state (postal abbreviation), and ZIP code (please use distinct fields for each data type);
e. Vehicle identification number (17-character VIN);
f. Vehicle's make, model and model year (please use distinct fields for each data type);
g. Vehicle's mileage at time of incident (numeric data type);
h. Incident date (MM/DD/YYYY);
i. Report or claim date (MM/DD/YYYY);
j. Whether a crash 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 2010, or a compatible format, entitled "REQUEST NUMBER TWO DATA." A pre-formatted data collection file, which provides further details

regarding this submission, will be provided to you.

GM RESPONSE:

GM has produced the requested information for the Subject Vehicles in the G243269_1_GM folder in the subfolder labeled "Q_03". Refer to the Microsoft Access 2010 file labeled "Q_03_REQUEST NUMBER TWO DATA."

REQUEST 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. Describe in detail the search methods and search criteria used by GM to identify the items in response to Request No. 2.

GM RESPONSE:

With respect to Request 4, GM CAC, PAC, TAC and Legal records are GM's primary repositories of potentially responsive documents in the ordinary course of business. GM identified responsive documents by conducting a keyword search of these records for potentially responsive claims and reviewed the associated claim file to confirm the responsiveness of the claim. GM is producing the responsive, nonprivileged documents associated with responsive claims listed in Table 2-1 in the Microsoft Access file labeled "Q_03_REQUEST NUMBER TWO DATA" in the subfolder labeled "Q_03" subfolder in the G243269_1_GM folder. GM has organized the records by the GM file number.

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

REQUEST 5

State, 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.

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

a. GM's claim number;
b. Vehicle owner or fleet name (and fleet contact person), email address and telephone number (please use distinct fields for each data type);
c. Vehicle owner or fleet street address, city, state (postal abbreviation), and ZIP code (please use distinct fields for each data type);
d. Vehicle identification number (17-character VIN);
e. Repair date (MM/DD/YYYY);

f. Vehicle mileage at time of repair (numeric data type);
g. Repairing dealer's or facility's name, telephone number, city and state or ZIP code (please use distinct fields for each data type);
h. Labor operation number(s);
i. Problem code(s);
j. Diagnostic trouble code(s);
k. Replacement part number(s) and description(s);
l. Concern stated by customer;
m. Cause as stated on the repair order;
n. Correction as stated on the repair order; and
o. Additional comments, if any, by dealer/technician relating to claim and/or repair.

Provide this information in Microsoft Access 2010, or a compatible format, entitled "WARRANTY DATA." A pre-formatted data collection file, which provides further details regarding this submission, will be provided to you.

GM RESPONSE

To collect warranty data responsive to this request, GM conducted a reasonable keyword search of the GM Global Analysis and Reporting Tool ("**GART**"), GM's primary repository of potentially responsive warranty claim information in the ordinary course of business.

In determining the responsiveness of a claim, GM erred on the side of coding the claim as responsive, even if the evidence in GM's possession linking the claim to the Alleged Defect was implausible, inconclusive, or circumstantial. Accordingly, the claim totals in Table 5-1 are conservative.

Table 5-1, below, summarizes the warranty claims for the Subject Vehicles that may relate to the Alleged Defect.[3] There are a total of 15,134 warranty claims (15,007 unique VINs) categorized as responsive.[4]

MAKE	MODEL	2016	2017	2018	2019	TOTAL
Chevrolet	Volt	1,592	11,489	2,039	14	15,134

TABLE 5-1: SUMMARY OF SUBJECT VEHICLE WARRANTY CLAIMS

Figure 5-1 and Table 5-2, below, show the Incidents Per Thousand Vehicles ("**IPTV**") for the Subject Vehicles by model year. Figure 5-2 shows the Subject Vehicle warranty claim rate by vehicle build date.

[3] GART does not contain the vehicle owner's name or telephone number. Additionally, some replacement part numbers, part descriptions and customer concern code descriptions are not included in the GM warranty database. In response to subpart (j), the diagnostic trouble code (DTC) is not captured separately and, if available, is included in one of the verbatim fields.

[4] GM identified responsive records based on the information supplied to GM by the servicing dealerships, which can contain material errors and omissions. Warranty records, for example, do not always accurately or completely describe the condition of the allegedly defective part at the time of the warranty correction, and service personnel may not consistently classify warranty repairs using the correct labor and trouble codes.

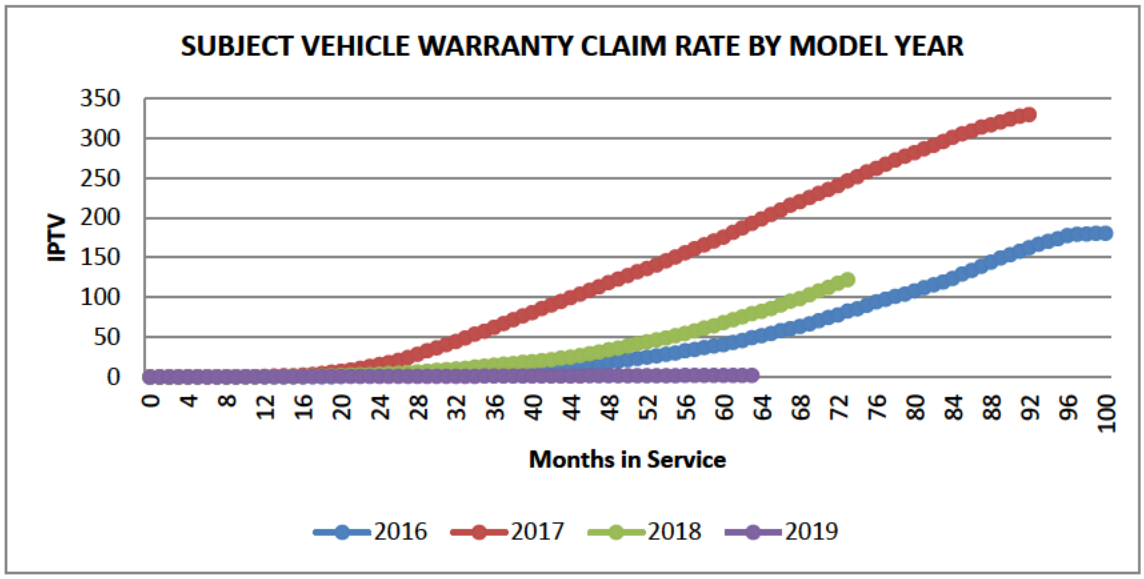

FIGURE 5-1: SUBJECT VEHICLE WARRANTY CLAIM RATE

	2016	2017	2018	2019
IPTV	181	330	122	2.2
MIS	100	92	73	62

TABLE 5-2: SUBJECT VEHICLE WARRANTY CLAIM RATE

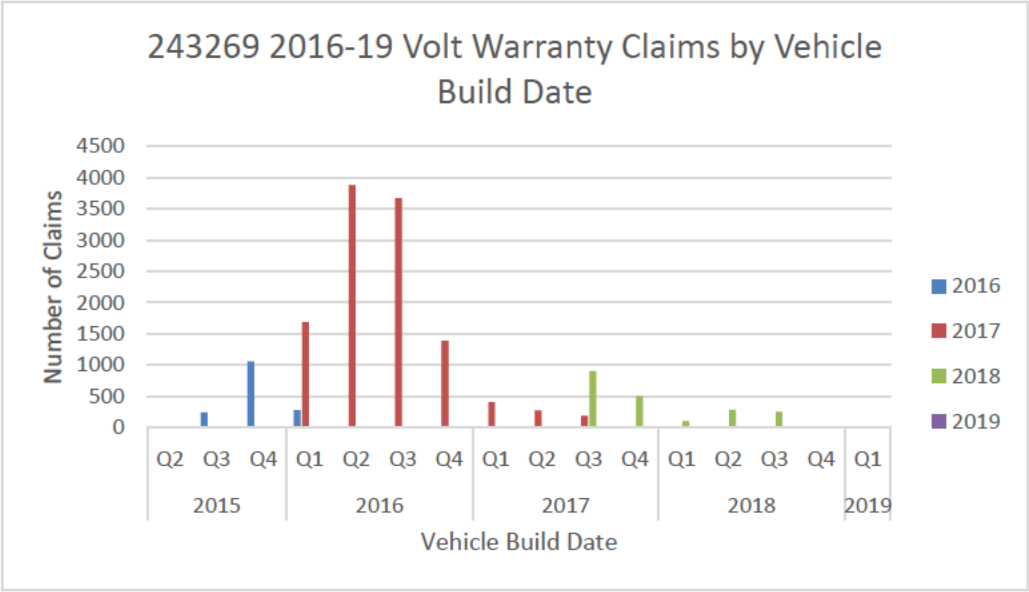

FIGURE 5-2: SUBJECT VEHICLE WARRANTY CLAIM RATE BY VEHCILE BUILD DATE

As shown in Figure 5-1, almost all warranty claims occurred during the 2016 through 2018 model years, with an observed build spike period from Q4 of calendar year 2015 to Q4 of calendar

year 2016 (shown in Figure 5-2).

The Tier 3 supplier identified a failure mechanism on a subcomponent of the Subject Component consisting of a broken heel bond at the buffer (74HC126) / NAND (74HC132) integrated circuits (ICs). This failure mechanism is depicted in the BECM (VITM) Failure Mode document in the G243269_2_GM_CONF folder in the subfolder labeled "Q_05." The root cause was determined to be the delamination of epoxy mold compound caused by lower adhesion strength that results in the broken heel bond. When this failure mechanism occurs, there is a loss of communication within the Subject Component between the BECM primary microcontroller and the secondary battery management Application Specific Integrated Circuits ("ASICs"). The BECM communicates the subject matter failure to the Hybrid Powertrain Control Module 2 ("HPCM2")[5]. A high failure rate was identified by the supplier in one Buffer IC lot and one NAND IC lot utilized within the observed build spike period.

GM released Technical Service Bulletin 18-NA-261 on June 24, 2018, to support diagnosis and servicing of the Subject Component. An update was released on March 09, 2022, to include MY 19 and update the parts information section. Service Bulletin 18-NA-261 is in the G243269_1_GM folder in the subfolder labeled "Q_09".

The Tier 3 buffer and NAND gate IC supplier changed for model year 2019, mitigating the failure mechanism and resulting in the low IPTV rate for model year 2019.

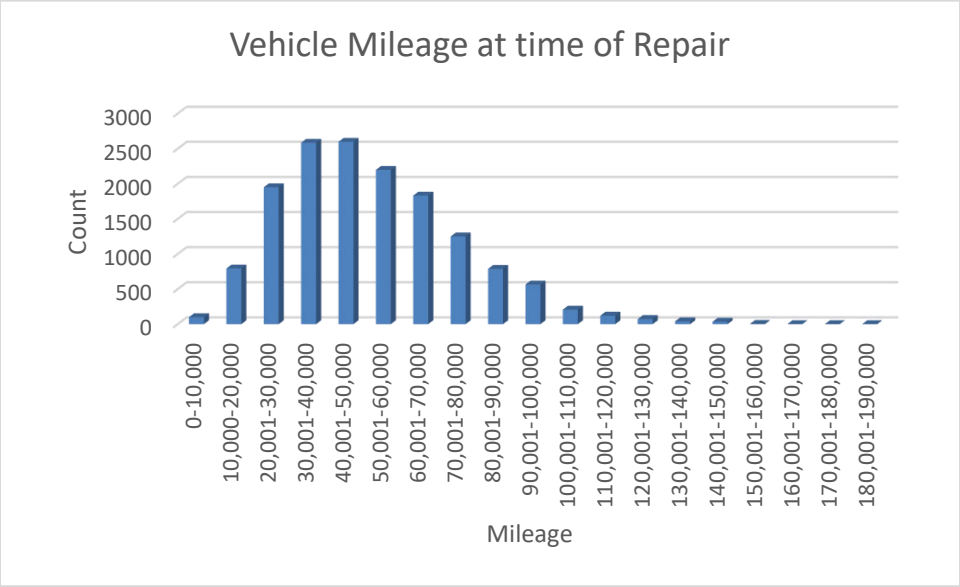

FIGURE 5-3: SUBJECT VEHICLE WARRANTY CLAIM RATE BY VEHCILE MILEAGE

GM's original warranty coverage for the Subject Component in the Subject Vehicles is considerably longer than GM's standard component level warranty: 8 years/100,000 miles or 15

[5] The HPCM2 is also referred to as the Vehicle Integrated Control Module, ("VICM").

years / 150,000 miles depending on applicable emissions regulations in the original state of sale. As shown in Figure 5-3, most claims occur within the original mileage warranty period. And as discussed in the response to Request 14, GM recently extended the warranty coverage for the Subject Components on vehicles with 8 year and 100,000 mileage coverage to 15 year and 150,000 mileage coverage.

GM has produced the requested information in subparts (a) through (o) in the G243269_1_GM folder in the subfolder labeled "Q_05". Refer to the Microsoft Access 2010 file labeled "Q_05_WARRANTY DATA." In response to subparts (l), (m) and (n) GM has included in these records, all available dealer-provided "verbatim text" in the GART database relating to the responsive claims that are currently in GM's possession[6].

REQUEST 6

Describe in detail the search methods and search criteria used by GM to identify the claims in response to Request No. 5, including the labor operations, problem codes, diagnostic trouble codes, part numbers and any other pertinent parameters used.

GM RESPONSE:

To collect warranty data responsive to this request, GM conducted a reasonable keyword search of the GM GART, GM's primary repository of potentially responsive warranty claim information in the ordinary course of business.

In determining the responsiveness of the claim, GM erred on the side of coding the claim as responsive, even if the evidence in GM's possession linking the claim to the Alleged Defect was implausible, inconclusive, or circumstantial.

REQUEST 7

Provide a list of all labor operations, labor operation descriptions, problem codes, problem code descriptions, diagnostic trouble codes, and diagnostic trouble code descriptions applicable to the alleged defect in the subject vehicles. State whether the diagnostic trouble codes are automatically reported to the warranty database electronically or manually entered the warranty database by a claims administrator.

GM RESPONSE:

To populate Table 5-1, GM searched the GART warranty database for the labor code that GM identified as potentially related to the Alleged Defect in the Subject Vehicles. This labor code is listed in Table 7-1. Each warranty record may have up to five verbatim fields. All verbatim claim fields were read, and a claim was determined to be responsive if the verbatim indicated that the claim may have been related to the Alleged Defect in the Subject Component.

[6] The verbatim text is provided to GM by the dealer that serviced the warranty claim and reflects both dealer- and customer-provided comments relating to the claim.

LABOR CODE	LABOR CODE DESCRIPTION
5031010	Battery Energy Control Module Replacement

Table 7-1: Labor Code Used in Gart Warranty Search

Table 7-2 summarizes the diagnostic trouble codes (DTC) and descriptions that may be related to the Alleged Defect in the Subject Vehicles. This DTC will set due to a malfunction of the Subject Component and is not necessarily due to the Alleged Defect. Additional diagnostics are done by the dealer to determine the specific component causing the DTC to set. If the DTC is entered in the verbatim of the warranty claim, it is manually entered by the dealer that serviced the vehicle.

In response to the problem codes and problem code descriptions request, these are identified for each of the relevant warranty claims in the Microsoft Access 2010 file labeled "Q_05_WARRANTY DATA."

DTC	DTC Description
U2603	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 1
U2604	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 2
U2605	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 3
U2606	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 4
U2617	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 5
U2618	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 6
U2619	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 7
U2620	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 8
U2621	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 9
U2622	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 10
U2623	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 11
U2624	Battery Energy Control Module Lost Communication with Hybrid/EV Battery Interface Control Module 12

TABLE 7-2: DIAGNOSTIC TROUBLE CODES

REQUEST 8

State, by make and model year, the terms of the new vehicle warranty coverage 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.

GM RESPONSE:

Table 8-1 summarizes the terms of new vehicle warranty coverage offered by GM on the Subject Vehicles on the Subject Component.

MODEL YEAR	MAKE	MODEL	WARRANTY TYPE	WARRANTY TERMS
2016-2019	Chevrolet	Volt	8/100 Voltec Warranty OR 15/150 PZEV Emissions Warranty	8 year / 100,000 miles OR 15 year / 150,000 miles

TABLE 8-1: NEW VEHICLE WARRANTY COVERAGE OFFERED BY GM ON SUBJECT VEHICLES

Many different optional extended warranty plans were available for the Subject Vehicles through GM dealerships. These plans were offered at different prices and for varying lengths of time, based on a customer's preference.

REQUEST 9

Produce copies of all service, warranty, and other documents that relate to, or may relate to, the alleged defect in the subject vehicles, 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 RESPONSE:

The documents that are responsive to Request 9 are in the G243269_1_GM folder in the subfolder labeled "Q_09".

REQUEST 10

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.

GM RESPONSE:

GM identified responsive production investigations by conducting a reasonable search in GM's Global Vehicle Safety-Case Observation Review and Evaluation ("**GVS-CORE**") database, which is the primary electronic records database for GM's Safety and Field Investigations organization. The product investigations that are responsive to Request 10 are summarized in the PE23-022 Related Investigations file in G243269_2_GM_CONF folder in the subfolder labeled "Q_10".

GM is producing the nonprivileged documents that are responsive to Request 10 in the G243269_1_GM and G243269_2_GM_CONF folders in the subfolders labeled "Q_10". The index file PE23-022 Q10 Index provided is a directory of the files with the original file names and is labeled as listed in PE23-022 Related Investigations.

REQUEST 11

Describe all modifications or changes made by, or on behalf of, GM 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:
The date or approximate date on which the modification or change was incorporated into vehicle production;

a. A detailed description of the modification or change;
b. The reason(s) for the modification or change;
c. The part number(s) (service and engineering) of the original component;
d. The part number(s) (service and engineering) of the modified component;
e. Whether the original unmodified component was withdrawn from production and/or sale, and if so, when;
f. When the modified component was made available as a service component; and
g. 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 RESPONSE:

Table 11-1 below lists all changes to the Subject Component associated with the Alleged Defect.

EWO #	EWO Plant BP Date	Description and reason for change or modification	EWO Reason	Old Part Number (Production)	Old Part Number (Service)	New Part Number (Production)	New Part Number (Service)
2865170	7/12/2018	BECM hardware supplier change for Buffer & NAND Gate for high mileage/TIS warranty improvement and software fix for Communication Gateway Module U1862 sensitivity.	Tier 3 Supplier Change for NAND Gate and Buffer Production and Service Release for MY19	24292314	24289067	24294961	24294960
2912010	8/7/2018	BECM hardware supplier change for Buffer & NAND Gate for high mileage/TIS warranty improvement and software fix for Communication Gateway Module U1862 sensitivity.	Tier 3 Supplier Change for NAND Gate and Buffer Service Release for MY16-18	24292314	24289067	24294961	24294960

TABLE 11-1: CHANGE TO SUBJECT COMPONENT RELATED TO SUBJECT COMPONENT FAILURE MODE

In response to subparts (e-g), the production component was not pulled from production/or sale until the breakpoint at the production plant on June 27, 2018. At that time, the Subject Component changed from production part number 24292314 to part number 24294961. The modified component was made available as a service component, PN 24294960, on August 7, 2018. The modified component is interchangeable with the earlier production component.

There are no modifications or changes that GM is aware of which may be incorporated into vehicle production within the next 120 days.

REQUEST 12

State the number of each of the following 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:

a. Subject component;
b. Similar or substantially similar components; and
c. Any kits that have been released, or developed, by GM 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 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.

GM RESPONSE:

The requested sales information for the Subject Component in both production and service versions is provided in the G243269_1_GM folder; subfolder labeled "Q_12." There are two files, one for dealer repair orders and one for customer paid part ticket sales. The dealer RO file summarizes the sale volume by make, model and model year and date of sale. The make, model and model year are not provided in the customer paid file since VIN information is not available.

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 or, in the case of a dealer sale, whether the part was actually used to repair a customer vehicle or is being held as dealer stock. The Subject Component may also be replaced for other conditions or due to accident damage. Therefore, it is difficult to draw any conclusions regarding the performance of the Subject Component, or malfunctions thereof, from this data.

In addition to the 2016-2019 Volt, the Subject Component was installed on the 2017-2023 Bolt EV and 2022-2023 Bolt EUV. In the 2017-2019 Bolt EV, built with the same Tier 3 sub-component as the 2016-2019 Volt, the failure mode IPTV was only 2.1 at 68 months in service. Power spectral density analysis showed a low measure of vibration at the Subject Component location in the Bolt EV due to unique packaging and vehicle structure.

REQUEST 13:

Describe how the propulsion system connected to the subject component operates, and include:

a. Any diagram(s) or schematic(s) necessary; and
b. The function of the Rechargeable Energy Storage System (RESS) as well as how it operates within the system.

GM RESPONSE:

In response to subparts (a) and (b), GM provides the 2016 Chevrolet Volt Service Manual Hybrid/EV Energy Storage Description and Operation document and Battery Energy Control Module Power, Ground and Data Communication Schematic located in the G243269_1_GM folder in the subfolder labeled "Q_13".

REQUEST 14:

Furnish GM'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;
f. How malfunctions of the RESS affect the propulsion system;

g. How malfunctions of the RESS differ from subject component failures; and
h. The reports included with this inquiry.

GM RESPONSE:

The Alleged Defect, defined in the Requests as a "loss of motive power," is not how the Subject Vehicles are designed to respond to the applicable fault conditions in the Subject Component. The subcomponent failure mechanism was identified by GM's Tier 3 supplier as a broken heel bond at certain ICs within the Subject Component. When this failure mechanism occurs, there is a loss of communication within the Subject Component between the BECM main microcontroller and the secondary battery management ASICs. The Subject Component communicates the subject matter failure to the HPCM2.

This condition is specific to the Subject Component. The Subject Vehicles are equipped with diagnostics that monitor the RESS for other malfunctions, and which respond to those malfunctions in various ways. See, e.g., the HPCM2 Severity Status Remedial Action file provided in the G243269_2_GM_CONF folder in the subfolder labeled "Q_14." GM's warranty data analysis confirms this condition is specific to Subject Components manufactured by a single supplier and installed as original equipment in model year 2016 through 2018 Subject Vehicles.

This condition does not pose a risk to motor vehicle safety. If this condition occurs while driving, the vehicle will automatically limit acceleration, reduce vehicle speed, display a MIL and a reduced-propulsion message in the DIC. If it occurs while the vehicle is charging or off, the vehicle cannot be started or charged, and will display a MIL and a reduced propulsion message upon key on. This failure mode may be intermittent, and the vehicle will restart if the failure mode is not present. These mitigations and warnings prevent damage to the propulsion system or the vehicle and provide appropriate warning to the driver.

This conclusion is confirmed by GM's field-data analysis. Out of 72,924 Subject Vehicles, there have been zero reported accidents, injuries, or fatalities associated with failure of the Subject Component. The VOQs reported to NHTSA regarding the Subject Vehicles do not allege any accidents, injuries, or fatalities, and nearly half of the potentially relevant VOQs relate only to part availability. On January 18, 2024, GM's Safety Field Action Decision Authority extended the original warranty coverage for the Subject Components on Subject Vehicles containing potentially impacted Subject Components. Model year 2016-18 Subject Vehicles sold with 8 year /100,000 mile coverage now have warranty coverage for the Subject Components to 15 year/150,000 miles.

Many of the reports included with this inquiry are produced in response to Request 10. The remaining reports responsive to Request 10 will be produced by February 12, 2024.

CONCLUSION

While GM will continue to monitor the performance of the Subject Component in the Subject Vehicles in the field, GM concludes, based on current data, that the Subject Component in the Subject Vehicles do not pose an unreasonable risk to motor vehicle safety. GM's Responses

are based upon its investigation to date and reflect its current information and assessment. GM reserves the right to supplement or amend its Responses as appropriate.

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

Sincerely,

[redacted]

Sabrina Groshek, Executive Director
Global Systems and Product Investigations

cc: Ms. Sharon Yukevich
Sean Hays
ODI_IRresponse@dot.gov

Enclosures

G243269_1_GM – Public copy of GM's document production

G243269_2_GM_CONF