LG Energy Solution Michigan, Inc.
Response to April 4, 2022 Information Request (EQ 22-001)

This response to the Agency's April 4, 2022 Information Request regarding Equipment Query (EQ) 22-001 is submitted on behalf of LG Energy Solution Michigan, Inc., a U.S. subsidiary of LG Energy Solution, Ltd. (collectively referred to herein "LGES").

This response was prepared pursuant to a diligent search for the requested information. The scope of LGES's search for responsive information focused on the locations where responsive information is most likely to be maintained and on review of LGES files in which responsive information ordinarily would be expected to be found and to which LGES ordinarily would refer. LGES notes that although electronic information was included within the scope of its search, it has not attempted to retrieve from computer storage electronic files that were overwritten or deleted.

Responses to the Agency's requests are set forth below. LGES is providing responsive information only insofar as such information is not subject to the attorney-client privilege or attorney work product.

NHTSA's Definition of LGES

This information request defines LGES as "LG Energy Solutions, LG Chem, and LG Electronics." LGES understands that the phrase "LG Energy Solutions" should refer to LG Energy Solution, Ltd. and its U.S. subsidiary, LG Energy Solution Michigan, Inc. This response is being submitted on behalf of LG Energy Solution Michigan, Inc., which is a separate legal entity from LG Chem and LG Electronics.

Background on Battery Components

Generally speaking, high-voltage, lithium-ion batteries have three primary components: battery cells, battery modules, and a battery pack. As the Agency is aware, battery cells are comprised of multiple layers of cathodes, anodes, and separators that are filled with electrolyte mixtures. In vehicle batteries, battery cells are bundled together in a separate manufacturing process to create the battery module. In yet another manufacturing process, battery modules are grouped together into a battery pack consisting of mechanical, electrical, and thermal components, along with a battery management system.

Each of these primary components (battery cells, battery modules, and battery packs) is manufactured in a separate process and customized to meet the specifications and tolerances of a specific OEM's design and performance requirements. Customization occurs at each component level. For example, the precise electrolyte mixture in the battery cell may be adjusted based on the charging strategy the OEM intends to utilize in the target vehicle application. Customization also includes manufacturing processes, such as tolerances for specific welding stations. Due to this high-level of OEM customization, battery cells for different OEMs and vehicles are produced on manufacturing lines that are unique for each such OEM and vehicle.

The component manufacturer goes through a rigorous design and production validation process that includes concept verification, design verification, process development, and production validation before the OEM approves the specific design and manufacturing line for mass production of the OEM's component. Each battery component (cells, modules, and packs) goes through this systematic validation process. Moreover, while this overall validation process generally describes the process, each OEM has its own unique requirements for its vehicle(s). Due to the customization of the component design and manufacturing processes, as well as the distinct validation process for each of these components, LGES assigns a unique name for the cell and battery type.

Within these processes, the finished product that LGES manufactures and ships to a particular OEM varies. For some vehicles, LGES manufactures only the battery cells, which are then supplied to a separate module manufacturer. For other vehicles, LGES manufactures both the battery cell and the battery module, which are then supplied to the manufacturer of the battery pack, which could either be the OEM or another supplier. Finally, LGES also manufactures battery packs, which use LGES's battery cells and modules and are supplied directly to the OEM.

The Agency's information request seeks customer and sales information for "the same or similar LGES high voltage batteries" received by vehicle manufacturers (OEMs). NHTSA did not define its usage of the phrase "LGES high voltage batteries." Because LGES's role in the supply chain among its OEM customers varies, LGES interprets this phrase as requesting sales information for the final component supplied by LGES.

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As requested, after each numeric designation, we have set forth verbatim the request for information, followed by LGES's response. Unless otherwise stated, LGES has undertaken to provide responsive information dated up to and including the date of the information request.

As to MBUSA recall 20V-107:

Request No. 1

Provide a list of all customers that received the same or similar LGES high voltage batteries and provide their company name, line of business (i.e. vehicle manufacturer, equipment manufacturer, distributor, retailer, etc.), address, phone number, contact person, quantity sold to each, and sale date.

Response to Request No. 1

In accordance with 49 CFR Part 512, responsive information is contained in LGES's request for confidential treatment in the file named "Conf Bus Info –Response to EQ22001 IR Req. Nos. 1, 4, 7, 10, and 13.xlsx." This file contains detailed customer information and sales volumes. For "sale date," LGES provided sales volumes per calendar year. With respect to the battery system in the vehicle recalled by MBUSA in Recall No. 20V107, LGES supplied the battery cells only.

Request No. 2

Does LGES intend to file a Part 573 Defect Information Report with NHTSA for this matter? If LGES does not agree with MBUSA that these high voltage batteries contain a safety related defect, you must explain your decision, including all supporting documents, analysis, and/or test reports.

Response to Request No. 2

LGES does not intend to file a Defect Information Report under 49 CFR Part 573 (Part 573 Report). Because LGES supplied the battery cell installed in the subject vehicle only for use in Mercedes-Benz vehicles, NHTSA's regulations consider MBUSA's Part 573 Report as meeting any reporting requirements that may apply to LGES under 49 CFR 573.6. *See* 49 CFR 573.3(e).

By way of further information, as noted in MBUSA's Part 573 Report, the defect that prompted this recall was due to cell-internal welding of the main cell conductors that was not performed to production specifications. The production line on which this out-of-specification welding issue occurred was a designated, customized line for this cell for this customer; no batteries for other OEMs were produced on this line.

Request No. 3

Provide the following details for the LGES-produced battery cells used in the recalled vehicles as original equipment.

a. Cell type (pouch prismatic, etc.)
b. Cathode material
c. Anode material
d. Separator material
e. Electrolyte
f. Cell dimensions
g. Number of anode and cathode layers
h. Plant where the cells were manufactured

Response to Request Nos 3

In accordance with 49 CFR Part 512, responsive information is contained in LGES's request for confidential treatment in the file named "Conf Bus Info –Response to EQ22001 IR Req. Nos. 3, 6, 9, 12, and 15.pdf."

As to Hyundai recall 20V-630 and recall 21V-127:

Request No. 4

Provide a list of all customers that received the same or similar LGES high voltage batteries and provide their company name, line of business (i.e. vehicle manufacturer, equipment manufacturer, distributor, retailer, etc.), address, phone number, contact person, quantity sold to each, and sale date.

Response to Request No. 4

In accordance with 49 CFR Part 512, responsive information is contained in LGES's request for confidential treatment in the file named "Conf Bus Info –Response to EQ22001 IR Req. Nos. 1, 4, 7, 10, and 13.xlsx." This file contains detailed customer information and sales volumes. For "sale date," LGES provided sales volumes per calendar year. With respect to the battery system in the vehicles recalled by Hyundai in Recall Nos. 20V-630 and 21V-127, LGES supplied the battery cells only.

Request No. 5

Does LGES intend to file a Part 573 Defect Information Report with NHTSA for this matter? If LGES does not agree with Hyundai that these high voltage batteries contain a safety related defect, you must explain your decision, including all supporting documents, analysis, and/or test reports.

Response to Request No. 5

LGES does not intend to file a Defect Information Report under 49 CFR Part 573. Because LGES supplied the battery cell installed in the subject vehicle only for use in Hyundai vehicles, NHTSA's regulations consider Hyundai's Part 573 Report as meeting any reporting requirements that may apply to LGES under 49 CFR 573.6. *See* 49 CFR 573.3(e). Moreover, LGES provided extensive details regarding the root-cause analysis in its response to NHTSA's September 21, 2021 Information Request regarding Preliminary Evaluation ("PE") 20-016. *See* LGES November 19, 2021 Responses to Request Nos. 8, 9, and 12.

Request No. 6

Provide the following details for the LGES-produced battery cells used in the recalled vehicles as original equipment.

a. Cell type (pouch prismatic, etc.)
b. Cathode material
c. Anode material
d. Separator material
e. Electrolyte
f. Cell dimensions
g. Number of anode and cathode layers
h. Plant where the cells were manufactured

Response to Request Nos 6

In accordance with 49 CFR Part 512, responsive information is contained in LGES's request for confidential treatment in the file named "Conf Bus Info –Response to EQ22001 IR Req. Nos. 3, 6, 9, 12, and 15.pdf."

As to GM recall 20V-701 and recall 21V-650:

Request No. 7

Provide a list of all customers that received the same or similar LGES high voltage batteries and provide their company name, line of business (i.e. vehicle manufacturer, equipment manufacturer, distributor, retailer, etc.), address, phone number, contact person, quantity sold to each, and sale date.

Response to Request No. 7

In accordance with 49 CFR Part 512, responsive information is contained in LGES's request for confidential treatment in the file named "Conf Bus Info –Response to EQ22001 IR Req. Nos. 1, 4, 7, 10, and 13.xlsx." This file contains detailed customer information and sales volumes. For "sale date," LGES provided sales volumes per calendar year. With respect to the battery system in the vehicles recalled by GM in Recall Nos. 20V-701 and 21V-650, LGES's data is broken into three groups: (1) the volume of design-level N2.1 battery cells supplied to LG Electronics (LGE), (2) the volume of design-level N2.2 battery cells supplied to LGE, and (3) the volume of battery cells contained in complete battery packs that LGES supplied to LGE.[1]

Request No. 8

[1] In October 2020, LGES acquired the facility that manufactured the module and pack for the Chevrolet Bolt vehicles subject to Recall Nos. 20V-701 and 21V-650. Because LGES became the manufacturer of the battery cells, modules, and packs at that time, the sales data reflects this change.

Does LGES intend to file a Part 573 Defect Information Report with NHTSA for this matter? If LGES does not agree with GM that these high voltage batteries contain a safety related defect, you must explain your decision, including all supporting documents, analysis, and/or test reports.

Response to Request No. 8

LGES does not intend to file a Defect Information Report under 49 CFR Part 573. Because LGES supplied the battery cell (and later the battery pack) installed in the subject vehicles only for use in GM vehicles, NHTSA's regulations consider GM's Part 573 Report as meeting any reporting requirements that may apply to LGES under 49 CFR 573.6. *See* 49 CFR 573.3(e). Moreover, LGES provided extensive details regarding the root-cause analysis in its response to NHTSA's September 21, 2021 Information Request regarding PE 20-016. *See* LGES November 19, 2021 Responses to Request Nos. 8, 9, and 12.

Request No. 9

Provide the following details for the LGES-produced battery cells used in the recalled vehicles as original equipment.

a. Cell type (pouch prismatic, etc.)
b. Cathode material
c. Anode material
d. Separator material
e. Electrolyte
f. Cell dimensions
g. Number of anode and cathode layers
h. Plant where the cells were manufactured

Response to Request Nos 9

In accordance with 49 CFR Part 512, responsive information is contained in LGES's request for confidential treatment in the file named "Conf Bus Info –Response to EQ22001 IR Req. Nos. 3, 6, 9, 12, and 15.pdf."

As to FCA recall 22V-077:

Request No. 10

Provide a list of all customers that received the same or similar LGES high voltage batteries and provide their company name, line of business (i.e. vehicle manufacturer, equipment manufacturer, distributor, retailer, etc.), address, phone number, contact person, quantity sold to each, and sale date.

Response to Request No. 10

In accordance with 49 CFR Part 512, responsive information is contained in LGES's request for confidential treatment in the file named "Conf Bus Info –Response to EQ22001 IR Req. Nos. 1, 4, 7, 10, and 13.xlsx." This file contains detailed customer information and sales volumes. For "sale date," LGES provided sales volumes per calendar year. With respect to the battery system in the vehicles recalled by FCA in Recall Nos. 22V-077, LGES supplied the battery pack to FCA. The response includes data for packs supplied to FCA and to one additional purchaser for installation in on-highway applications.

Request No. 11

Does LGES intend to file a Part 573 Defect Information Report with NHTSA for this matter? If LGES does not agree with FCA that these high voltage batteries contain a safety related defect, you must explain your decision, including all supporting documents, analysis, and/or test reports.

Response to Request No. 11

Based on the evidence and analysis currently available, LGES has not determined that its components contain a safety-related defect. LGES is continuing to work with FCA US LLC ("FCA US") to investigate the root cause of the alleged field incidents that underlie FCA US' defect information report in Recall No. 21V-077.

With respect to whether LGES agrees with FCA US "that these high voltage batteries contain a safety related defect," LGES does not believe that this statement accurately reflects FCA US' defect information report nor what is currently known about the cause of the alleged field incidents in the subject vehicles.

In its Part 573 Report, FCA US stated that it determined that the subject vehicle may experience a fire potentially originating in the center of the vehicle underbody with the ignition in the "OFF" mode. Further, LGES understands that, based on the field investigations that have been undertaken to date, FCA US believes that at least some of the alleged fire incidents in the subject vehicle originated in the area of the high-voltage batteries. Based on this proximity to the high-voltage battery, FCA US identified the battery as being "involved" under the broad language in 49 U.S.C. § 30119(g).

As stated in the accompanying file, "Conf Bus Info –Response to EQ22001 IR Req. Nos. 1, 4, 7, 10, and 13.xlsx," a small number of these batteries was sold to one additional manufacturer (a vehicle alterer or modifier) for installation in on-highway EV applications. No thermal events have been reported from this customer. LGES is continuing to evaluate this investigation and, as necessary, will comply with the reporting requirement of 49 CFR Part 573. (We note that even if a battery defect is identified as the cause of the thermal incidents reported by FCA US, additional analysis would be necessary to determine whether the defect is present in the batteries supplied to LGES's other customer.)

Request No. 12

Provide the following details for the LGES-produced battery cells used in the recalled vehicles as original equipment.

a. Cell type (pouch prismatic, etc.)
b. Cathode material
c. Anode material
d. Separator material
e. Electrolyte
f. Cell dimensions
g. Number of anode and cathode layers
h. Plant where the cells were manufactured

Response to Request Nos. 12

In accordance with 49 CFR Part 512, responsive information is contained in LGES's request for confidential treatment in the file named "Conf Bus Info –Response to EQ22001 IR Req. Nos. 3, 6, 9, 12, and 15.pdf."

As to VW 22V-162:

Request No. 13

Provide a list of all customers that received the same or similar LGES high voltage batteries and provide their company name, line of business (i.e. vehicle manufacturer, equipment manufacturer, distributor, retailer, etc.), address, phone number, contact person, quantity sold to each, and sale date.

Response to Request No. 13

In accordance with 49 CFR Part 512, responsive information is contained in LGES's request for confidential treatment in the file named "Conf Bus Info –Response to EQ22001 IR Req. Nos. 1, 4, 7, 10, and 13.xlsx." This file contains detailed customer information and sales volumes. For "sale date," LGES provided sales volumes per calendar year. With respect to the battery system in the vehicles recalled by Volkswagen (VW) in Recall No. 22V-162, LGES supplied the battery modules.

Request No. 14

Does LGES intend to file a Part 573 Defect Information Report with NHTSA for this matter? If LGES does not agree with VW that these high voltage batteries contain a safety related defect, you must explain your decision, including all supporting documents, analysis, and/or test reports.

Response to Request No. 14

LGES does not intend to file a Defect Information Report under 49 CFR Part 573. Because LGES supplied the battery modules installed in the subject vehicles only for use in Volkswagen vehicles, NHTSA's regulations consider VW's Part 573 Report as meeting any reporting requirements that may apply to LGES under 49 CFR 573.6. *See* 49 CFR 573.3(e).

By way of further information, as noted in VW's Part 573 Report, the failures that prompted this recall were attributable to issues in the manufacture of specific soldering points on the flexible printed circuit assembly (FPCA) inside the HV battery. These FPCA's were supplied to LGES by a third party and were used by LGES only in modules manufactured for VW on a designated, customized production line for this customer.

Request No. 15

Provide the following details for the LGES-produced battery cells used in the recalled vehicles as original equipment.

a. Cell type (pouch prismatic, etc.)
b. Cathode material
c. Anode material
d. Separator material
e. Electrolyte
f. Cell dimensions
g. Number of anode and cathode layers
h. Plant where the cells were manufactured

Response to Request Nos. 15

In accordance with 49 CFR Part 512, responsive information is contained in LGES's request for confidential treatment in the file named "Conf Bus Info –Response to EQ22001 IR Req. Nos. 3, 6, 9, 12, and 15.pdf."

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Sincerely,

LG Energy Solution Michigan, Inc.