UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ASCEND ELEMENTS, INC.,

Petitioner,

v.

DUESENFELD GMBH,

Patent Owner.

Case No. IPR2024-00948
U.S. Patent No: 11,050,097

DECLARATION OF LYDIA GROTE

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I, Lydia Grote, declare and state as follows:

1. I am the Managing Director of Patent Owner Duesenfeld GmbH ("Duesenfeld"). Unless otherwise stated, the matters contained in this declaration are of my own personal knowledge and, if called as a witness, I could and would testify competently to the matters set forth herein.

2. Duesenfeld is an active participant in the market for the recycling of batteries from electric vehicles ("EVs"). Duesenfeld is a spin-off from a German university, the Technische Universität Braunschweig ("TU Braunschweig"). TU Braunschweig had conducted research in the early 2010's relating to improved methods for recycling EV batteries. Based on the research results arising from that work, and the intellectual property that flowed from the research, Duesenfeld was founded.

3. Duesenfeld's business model is to research and develop eco-friendly recycling processes for Lithium-Ion Batteries and to license the patents and know-how. We operate a recycling plant in Wendeburg, Germany for this purpose, not only to test the research in the laboratory and pilot plant, but also to conduct a three-shift operation with a throughput of 500 kg/h. Based on that know-how, Duesenfeld offers consulting services to companies around the world to integrate safer, more efficient, and more environmentally friendly approaches to EV battery recycling. Duesenfeld's consulting business is anchored by its patent portfolio.

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Duesenfeld charges patent royalties in exchange for offering its consulting services.

4. Duesenfeld's improved technologies falls in several categories. For instance, Duesenfeld has developed improved techniques for discharging electricity from batteries, which allows the energy to be utilized and makes the process safer for subsequent steps. Duesenfeld also has developed improved techniques for extracting precious metals from battery material that has already been shredded and dried into a powder called "black mass." The entire process chain is aligned with the goal of achieving a closed-loop raw material cycle for battery materials.

5. As claimed by the '097 patent, Duesenfeld developed techniques for safely producing black mass so that it can be safely transported. Shredding batteries poses a risk that the chemicals in the batteries will react with one another, creating workplace hazards and environmental harm. Prior art techniques focused on applying additives to the shredded material to neutralize it, like fire retardant, or brine. By contrast, Duesenfeld developed techniques for preparing black mass by drying off the solvent solutions that otherwise would facilitate unwanted chemical reactions. Duesenfeld realized that drying under vacuum levels of 300 hPa or below would allow the solvents to evaporate at lower temperatures and avoid toxic by-products. Duesenfeld identified particular benefit to vacuum drying the

shredded battery material at under 80°C in order to prevent the formation of hydrogen fluoride gas ("HF"), which is extremely hazardous.

6. Duesenfeld began construction on its recycling plant in Wendeburg, Germany in 2017. The construction of the plant of this new technology took several years. We started a discontinuous operation in 2018 and went into a continuous multi-shift operation in 2020. At all times, the Wendeburg Plant has recycled batteries using vacuum drying at a maximum pressure of 300 hPa and at temperatures under 80°C. Videos featuring Duesenfeld's plant are found at: https://www.youtube.com/watch?v=g1Ij4Emz8XQ ("How to recycle lithium-ion batteries? – Closing the loop in e-mobility", Dec. 6, 2023). Attached as Ex. 2053 is a brochure that describes the battery recycling process at Duesenfeld's Wendeburg Plant.

7. Attached as Exhibit 2041 are graphs showing the temperature and pressure conditions in the dryer, which we permanently record at our Wendeburg plant. [redacted]

[redacted]

[redacted]

[redacted]

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[1] [redacted]

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[redacted]

8. In light of the stability of the black mass produced by the Duesenfeld process, Duesenfeld qualified for a special regulatory status that its black mass is no longer regulated as waste and, instead, it has product status. Attached as Exhibit 2042 are the German Regulations entitled "Reorganising the Law on Closed Cycle Management and Waste" (see Section 5 at pp. 10-11, "End-of-waste status").[2] Duesenfeld's black mass is considered "end-of-waste" under the aforementioned Regulations because, *inter alia*, "its use does not lead to overall detrimental environmental or human health impacts." *Id.* Attached as Exhibit 2043 is the certification from the authorities at the Braunschweig State Trade Supervisory Office to Duesenfeld to confirm this special status pursuant to these Regulations. A certified English translation and the Certificate of Translation is also attached as Exhibits 2044 and 2045. Duesenfeld has been shipping its black mass to its

[2] This is the official English translation, which is available at https://www.bmuv.de/fileadmin/Daten_BMU/Download_PDF/Abfallwirtschaft/kreislaufwirtschaftsgesetz_en_bf.pdf

customers since at least 2019 and has never had a complaint or issue relating to the chemical stability of the black mass.

9. Duesenfeld's battery recycling processes have been commercially successful. [redacted] and all batteries processed were shredded and then dried at conditions of a temperature of less than 80°C and at a pressure of less than 300 hPa, after which the black mass was shipped in transport containers to our customers.

10. Third parties have entered into consulting agreements with Duesenfeld and licensed Duesenfeld's patents. [redacted]

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[redacted]

11. Seval S.r.l. and RiPlastic S.p.A. issued a press release dated June 11, 2024 that describes the licenses to Duesenfeld's patents. Ex. 2051 (June 11, 2024 Press Release). The press release states that "Seval and Riplastic will be the first industrial operators in Italy for the recycling of lithium-ion batteries." *Id.* The press release states that the license agreements enable "the exploitation of the patents necessary to the technological process chosen by Seval and Riplastic" and treatment plants represent "the largest investment ever for Seval and Riplastic". *Id.* The press release further states that "Thanks to this process, the treatment of lithium-ion batteries is carried out at a low temperature in complete safety, with emissions largely below the most stringent thresholds and no hydrogen fluoride release, producing a black mass with an excellent level of purity, rich in nickel, cobalt and lithium, as well as noble metals like aluminum, copper, iron. The technology also allows us to achieve a very high recovery rate as required by the new European Regulation 2023/1542."

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12. Attached as Exhibit 2052 is a press release dated February 10, 2025, announcing the cooperation agreement of equipment manufacturer ANDRITZ AG with Duesenfeld. Under the cooperation agreement, Duesenfeld is disclosing its technology to ANDRITZ, which will build a new reference plant for Duesenfeld, which will expand Duesenfeld's throughput and permit Duesenfeld to showcase its technology. By working with Andritz, Duesenfeld is enabling the international scaling of economically and ecologically advantageous recycling technology. The enlarged and upgraded plant in Wendeburg will continue to operate at the pressure and temperature conditions set forth above.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Dated: February 14, 2025

Lydia Grote

Lydia Grote

Duesenfeld

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