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November 8, 2021

The Honorable Matthew S. Borman
Deputy Assistant Secretary for Export Administration
U.S. Department of Commerce
1401 Constitution Ave NW
Washington, DC 20230

RE: Docket BIS 2021-0036

Dear Deputy Assistant Secretary Borman:

In response to the Department of Commerce Bureau of Industry's request for comment, Deere & Company ("Deere") submits the following responses to questions asked of "intermediate users and end users of semiconductor products or integrated circuits".

a. *Identify your type of business and the types of products you sell.*

Deere is a multi-national corporation that produces intelligent, connected machines and applications that are helping revolutionize the agriculture and construction industries, and enabling life to leap forward. Our technology driven efforts are guided by a single, overarching goal – unlocking customer economic value. Deere manufactures agricultural, construction, and forestry machinery, diesel engines, drivetrains (axles, transmissions, gearboxes) used in heavy equipment, and lawn care equipment; and provides government and military sales and financial services.

b. *What are the (general) applications for the semiconductor products and integrated circuits that you purchase?*

There are more than 1,000 semiconductors used in one of our typical large agriculture or construction vehicles. Integrated circuits are used in controllers on hydraulics, transmissions, engines, cameras, displays, receivers, and everything related to precision agriculture and other functions throughout the vehicles. The number of integrated circuits are growing rapidly.

c. *For the semiconductor products that your organization purchases, identify those that present the greatest challenge for your organization to acquire. Then for each product, identify the product attributes and purchases in 2019 and 2021, as well as average monthly orders in 2021. Then estimate the quantity of each product your organization would purchase in the next six months barring any production constraints as well as the amount your organization expects to actually be able to purchase. For each of your organization's top semiconductor*

products, estimate each product's lead times and your organization's inventory for (a) 2019 and (b) currently (in days). Provide an explanation of any current delays or bottlenecks.

One of the most difficult microchips for us to procure this year has been a microcontroller used on the StarFire™ GPS receiver. The receiver is one of the main elements for precise machine guidance and is a necessary element to precisely plant, apply nutrients, and harvest. In this case the semiconductor foundry did not produce any wafers to create this microcontroller for months. Our demand is up nearly 100% from 2019 to 2021 because the receivers, like other precision technologies, are embedded into more equipment. On top of the growing number of technologies in the equipment, overall equipment sales are also up. Due to constraints, we were forced to remove the receiver as a factory option until supply is available. Not including technologies like these on equipment has a significant impact on food production, as the technology improves farmers' efficiency and makes their operations more sustainable. We would purchase 2.5 times the number of parts we ordered in 2019 if we were able to procure them to meet growing demand.

d. *What are the primary disruptions or bottlenecks that have affected your ability to provide products to customers in the last year?*

Constrained wafer output from semiconductor manufacturers, depleted global inventory levels, raw material shortages, COVID shut-downs, and natural disasters (e.g., freeze in Texas, fire and flood).

e. *Is your organization limiting production due to lack of available semiconductors? Explain.*

Yes. We have seen the greatest impact on our precision agriculture products, receivers, displays and cameras. In other cases, we have had to delay sales until parts are available.

f. *What percentage of your current production has your organization had to defer, delay, reject, or suspend in the past year? Explain.*

We have been able to mitigate much of the production impact by utilizing the broker market and adopting alternatives. The display, receiver, and camera impact has been the largest at ~50%. There are also some technologies that the machine can work—albeit less efficiently--without, and we continued to build and ship due to the high customer demand. Without these technologies, these vehicles don't offer the latest precision agriculture capabilities, and customers/farmers are not able to, plant, apply nutrients, or harvest as efficiently. This impacts sustainability and total output. Deere has spent additional funds through brokers and expediting to mitigate the rest of the vehicle impacts. We have also had to invest in storage as we wait for a final controller to arrive before we can ship a complete vehicle, resulting in delayed sales.

g. *Is your organization considering or carrying out new investments to mitigate semiconductor sourcing difficulties? Explain.*

Yes. We will carry more inventory and safety stock as soon as the industry capacity can support it. We also understand the riskiest supply chains and will make changes to reduce complexity and risks within our supply chain.

h. *What semiconductor product types are most in short supply and by what estimated percentage relative to your demand? What is your view of the root cause?*

There are several root causes to shortages. The biggest impact is not having enough allocation from the semiconductor contract manufacturers. In these cases, we are getting 50-60% of our demand and have had to limit sales and cancel options. There is a particular processor we can't obtain because the semiconductor company is only getting 60% of its wafer demand from one of the semiconductor foundries through CY 2022. The other acute issues are from natural disasters such as floods, freezes, or fires and COVID shut-downs. These situations have impacted 2-3 months of supply and recovery has been difficult because there are no buffers left in the manufacturing process.

i. *Has your organization changed its material and/or equipment purchasing levels or practices in the past three years?*

Yes. We have made changes in our purchasing levels and practices in the last year because lead times are extended significantly. We have firmed our orders up 18 months out. In the past it was just a forecast and the distributor was able to react to any changes in orders. Now that lead times are 52 weeks, we have to solidify orders and hedge to cover for continued increase in demand.

j. *What single change (and to which portion of the supply chain) would most significantly increase your ability to purchase semiconductors in the next six months?*

The biggest bottle neck is getting wafer output from the large semiconductor foundries. The majority of our needs are classified in the automotive and consumer goods segments (e.g., mobile phones, TVs, cameras) and media. The most significant change would be to get additional allocation for the automotive segment where we participate. A specific designated allocation for agricultural machinery/heavy equipment would further ensure customers are getting the machinery they need to efficiently and sustainably produce food.

k. *What percentage of your orders are fulfilled by distributors versus through direct purchase orders to semiconductor product manufacturers?*

More than 90% of our business comes through distributors.

l. *For the semiconductor products your organization purchases, how long (in months) are the typical purchase commitments? How, if at all, do your organization's purchase commitments differ for products in short supply?*

Current lead times are 52 weeks, and in most cases, we will get commitments for an order as long as it is placed with enough lead time.

m. *Has your organization faced "de-commits" (defined as a notification from a supplier that expected or committed supply will not be delivered in the agreed-upon time and quantity) in recent months? If this is a significant issue, please explain (e.g., nature of product, supplier, impact).*

Yes. This has been the result of a shortage in raw materials needed to produce the semiconductors. In one case the foundry did not produce and deliver the wafers that were on order to the semiconductor manufacturer we buy the microchips from. They are all significant issues because when a decommit happens an order is cancelled and we have to explore alternatives, broker parts, and other pull-ins. The decommit causes significant delays, increased inefficiencies, and puts customers' and dealers' work to support the

growing world population at risk. Ultimately, the “decommits” require a high level of troubleshooting to keep production running.

Thank you for your consideration of these responses. If you have any additional questions, please contact Miles Chiotti, Manager of Government Affairs at ChiottiMiles@johndeere.com.

Sincerely,

Collis Jones
Vice President, U.S. Policy & Strategy