

April 30, 2023

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Dear Dr. Horne:

I am writing this letter in response to the notice, "United States Department of Agriculture, Agricultural Marketing Service Proposes Revisions to the Procedures related to Red Meat Instrument Grading" (January 4, 2023). Beef carcass grading has been the focus of my academic and professional career now for 25 years and I have been involved in the evolution and implementation of beef carcass instrument grading in the U.S. through several different roles and organizations. With that experience I appreciate, firstly, the need to update procedures as the beef industry and technology evolve, secondly, the challenge finding the correct elements and language to improve a program with industry acceptance. I hope that I can provide some comments that might be helpful in that process and ultimately help the industry take advantage of new innovations in beef carcass grading technology.

While I do find it advantageous to have a single instrument approval document instead of multiple documents like in the past, I believe the new requirement of having an instrument simultaneously pass the approval criteria for marbling score, ribeye area, fat thickness, and final yield grades is unnecessary and will be detrimental to the development of new technologies. With the recent advancements in vision Artificial Intelligence, I believe it will be much easier to develop operator-less vision systems and cell phone-based systems to predict marbling scores with much more accuracy and precision than current systems. However, I believe the time needed to develop those systems for ribeye area, fat thickness, and final yield grades to be relatively more difficult. Since marbling scores have a much higher impact on the beef industry in regards to value, I believe forcing such technologies to need to be approved to measure all factors instead of one at a time will deter or greatly lengthen the development cycle and lengthen the time at which a company could begin to recover development costs which will ultimately disincentive innovation. For small beef processors not to have access to cheaper, more portable cell phone-based technology to assess marbling scores because that technology has not been approved for factors could keep that segment of the industry at a disadvantage. Lastly, since most beef processors in the U.S. only use approved instruments for determining marbling scores it seems like this requirement is not aligned with current industry adoption.

Along the same reasoning, I believe the increased requirement for Ribeye Area measurement to 95% of the measurements within 1.0 square inch instead of 1.5 square inches is overly restrictive and will ultimately deter other companies from trying to develop a better technology for the industry. From my perspective there little to no benefit from increasing this requirement as it has little impact on increasing the accuracy of yield grade due to the small effect ribeye area has on final yield grade compared to fat thickness. Also if there were branded programs that were concerned about the ability of currently approved instruments to accurately measure ribeye area then they would have adjusted their ribeye area specifications accordingly. The impact of the angle of ribbing and variation of this process has more impact on a carcass's ribeye area than the accuracy of an instrument's measurement at these tolerances. For example, Steiner et al. (Journal of Animal Science, 2003. 81-), a study published with USDA AMS, found that there was 0.3 square inches of difference in ribeye area between sides of the same carcass. If USDA AMS has since collected data that differs from this, then they should make the effort to publish such information.

In everyday application of traditional grading within beef processing plants current procedures allow for a processor to hold carcasses and re-present them to up to six different graders. In all practical purposes this means that the carcass receives the highest assigned quality grade of the six different graders that are in that plant for that day. I mention this because while I agree that using an average of a gold standard panel is an acceptable method to evaluate the ability of an instrument system to effectively measure differences in marbling between carcasses, it doesn't provide the actual grade lines that exist in the industry to calibrate an instrument to. I believe that is the major reason an adjustment to increase the instrument marbling scores was necessary for industry adoption when instruments were first approved for determining marbling score. This discrepancy or gap (between the average of a gold standard panel and line grades), although I agree it may be tough to figure out, is a topic that absolutely needs to be addressed as part of these revisions to procedures. Without a method to address this discrepancy or gap, any comparison made from an average marbling score from a gold standard panel to the existing instruments is invalid. One method to approximate the gap would be to take the maximum of the individual gold standard panel marbling scores as the official instead of the average of the gold standard panel. With that said, if this approach were to be used, a panel of five graders would be more representative of every day in-plant practice than using a panel of three graders although it is important to remember that the variation that exists among line graders is greater than those graders selected to be part of the gold standard panel. Assessing the variability between graders is as important as determining the average of graders for marbling scores and that is why the five-member panel should be utilized instead of the three-member panel. If this discrepancy or gap is not addressed, I believe that there will be a

major disadvantage to any new or improved instruments that gain approval, and it will keep them from being implemented in the industry.

Finally, I'm glad to see QAD 516 draft procedures as I believe some constant process monitoring will add strength to the overall grading process. I suggest that before publishing the final requirements however, that USDA AMS work with the industry to conduct multiple examples of each of the steps and share the results and discuss them with the industry in order to build trust in that process and to get a better understanding if the comparison criteria is appropriate before they are finalized.

I appreciate the opportunity to comment and if I can provide further clarification or insight, I would be happy to.

Sincerely,

A handwritten signature in cursive script that reads "Derek Vote".

Derek Vote, Ph.D.

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