August 7, 2005

Professor Dale Sullivan
North Dakota State University
320 Minard
Fargo, ND 58105

Dear Professor Sullivan:

Enclosed is the final report concerning discourse practices in the beef carcass ultrasound profession within the beef industry for the web-based section of *English 320 – Practical Writing* through the College of Distance & Continuing Education at North Dakota State University.

The report is a result of conducted research on the use of discourse in beef carcass ultrasound and its application in various areas within the beef industry, through methods such as web-based research and interviews with two professionals in the area of carcass ultrasound technology. An analysis of three commonly used documents within the profession is also included within the results section.

Should you have any questions, or if any further information is needed, please feel free to contact me at the address below.

Sincerely,

Susan Olson

Enclosure

Ultrasound Technology Discourse:
Communication Practices in the Beef Carcass Ultrasound Profession

Susan Olson
North Dakota State University
English 320 Practical Writing-DCE

TABLE OF CONTENTS

ABSTRACT

This report looks at the discourse practices used in the beef carcass ultrasound profession within the beef industry. The introduction explains the purpose and objective, focusing on literary review. A description of research materials and methods reviews the investigative process. A section of discussion and results overviews the profession of choice, analyzes a broad range of documents, reviews a few chosen documents specific to the field, and discusses personal interviews with professionals. Lastly, a conclusion summarizes the findings of my research.

INTRODUCTION

In all types of successful communication, particularly written communication, or discourse, there includes a group of individuals with whom they interact; a place or medium where, or through which, they interact, using specific types or forms of communication methods. The purpose of written communication within disciplinary cultures is to facilitate the numerous social interactions that are influential in the production of knowledge (Berkenkotter & Huckin, 1995, p.1). Generally, we don't use language to communicate with the world at large, but with individuals or groups of individuals within communities; one of which used to describe written communication is discourse community (Borg, 2003, p. 398). According to Borg (2003, p. 398), the influential John Swales, a written communication analyst, described discourse communities as groups that have goals or purposes, and use communication to achieve these goals. The association with a discourse community is usually a matter of choice, with its members actively sharing goals and communicating with other members to pursue those goals, typically with the discussions focusing on the use and analysis of written communication (Borg, 2003, p. 398).

No matter to which discourse community we relate, understanding the genres of written communication in one's field is essential to professional success (Berkenkotter & Huckin, 1995, p. 1). Being a type or form of discourse, a genre is defined by Carolyn Miller as a "typified response to a recurrent situation." Bakhtin (1986, p. 63) describes genres as "typical forms of utterances"; as so, should be studied in their actual social contexts of use. According to Berkenkotter and Huckin (1995, p.1), genres are the media through which

scholars and scientists communicate with their peers, and are intimately linked to a discipline's methodology, and they package information in ways that conform to a discipline's norms, values, and ideology. In addition, genres change over time in response to their users' sociocognitive needs (Berkenkotter & Huckin, 1995, p. 4). Classified as one of two main types, a genre may be categorized for use in casual, everyday situations or for more formal situations, such as professional articles and related writing.

Within the discourse community, the medium by which we communicate, or the place where we communicate is thought of as a forum. A thorough analysis of a forum can be achieved by a series of questions involving the forums' style, form, discourse conventions, and background, as stated by Porter (1986, p. 46-47). It is by the success of this analysis that we may gain knowledge and understanding of the goals and interests of the discourse community in question.

METHODS

To gain a better understanding of discourse within the beef carcass ultrasound profession, a review of the Centralized Ultrasound Processing Lab's *Beef Cattle Real Time Ultrasound Training Manual* was initially conducted. Next, web-based research was performed in order to further comprehend discourse practices common within the carcass ultrasound field and the beef industry as a whole.

Although this research was beneficial in the analysis of a broad range of documents and helpful in developing a better understanding of the types of discourse, genres, and forums used in the beef industry, it was necessary to acquire information from professionals within the beef carcass ultrasound profession.

As outsider, or *ettic*, knowledge needs to be supplemented with or corrected by insider, or *emic*, knowledge, interviews were conducted via email with two certified ultrasound lab and field technicians. These views allow a more detailed personal analysis of discourse within the beef carcass ultrasound profession and help to emphasize the communication skills needed to succeed in this particular profession.

Lastly, five documents commonly used within the ultrasound profession were analyzed. These included a published informative article on the ultrasound industry with an intended audience of people in all areas of the beef industry, along with four equally important ultrasound data documents, intended for use by a select few, such as the individual scanning (certified ultrasound field technician--data entry) and employees of Walter & Associates, LLC at The Centralized Ultrasound Processing Lab (certified lab technicians or lab and field technicians--image and data interpretation/evaluation). In addition, there are certain portions of these documents, specifically, detailed animal information, intended to be filled out by the beef producer or breeder (seedstock producer), but will be completed by or with the help of a certified ultrasound technician as to keep ultrasound data organized and maintain its integrity. Although three of

the four ultrasound data documents contain the same information categories to be completed, they are differentiated by animal type (i.e. bull or non-bull). For this purpose, only one of the three similar documents will be discussed in the document analysis later in this report. The evaluation of these documents reiterated the specificity of the discourse practices and genres within the beef carcass ultrasound profession and the associated information's application within many areas of the beef industry.

RESULTS & DISCUSSION

AN OVERVIEW OF THE BEEF CARCASS ULTRASOUND PROFESSION

Using high frequency sound waves, real-time ultrasound allows us to "see inside" the animal to aid in evaluating carcass composition while it is still alive. Sound waves from a sound emitting probe, held snugly on the animal's back, bounce off the boundaries between fat and muscle layers and create a cross-sectional image, viewable on the ultrasound machine's screen and additional monitor used during scanning. (Wilson, et al, p. 1)

Ultrasound allows for a fast, objective prediction on the carcass composition of beef cattle, therefore, can be a useful tool in enabling beef producers to meet specific market demands in today's value-based marketing system. Genetic selection and subsequent breeding is also assisted by the application of carcass composition information. Through the accurate measurement of four economically important carcass traits, namely ribeye area (REA), back fat (BF),

intramuscular fat (IMF) or marbling, and rump fat (RF) at three locations on the animal, real-time ultrasound can prove as an inexpensive, noninvasive tool to evaluate animal quality and value within a beef producer's production system. (Wilson, et al, p.1; Williams, p.1)

Since certified ultrasound technicians work with people from various fields within the beef industry, it is important to be able to adapt communication styles to suit varying degrees of education and knowledge on the subject of ultrasound and its value and use in beef production systems.

BROAD ANALYSIS OF DOCUMENTS

To gain an understanding of the discourse in the, numerous documents were obtained and reviewed, all which belong to one of several customary styles commonly used in the field of ultrasound and the beef industry. The following outline is a broad analysis of the types of documents used in the beef carcass ultrasound profession and/or the beef industry. The italicized typeface indicates the title of a specific document that falls into a particular category. The 'References' section of this report contains more specific information on the represented documents.

I. Research or Research Progress Reports
   A. Directed toward ultrasound and beef industry professionals and/or research scientists
      1. *Predicting Beef Carcass Retail Product Using Real-time Ultrasound and Live Animal Measures: Progress Report*
      2. *The Use of Real-Time Ultrasound to Predict Live Feedlot Cattle Carcass Value*
      3. *Usefulness of Cross-Sectional Image to Predict Intramuscular Fat for Feedlot Application Using Real-Time Ultrasound*

4. *Evaluation of Ultrasound Measurements of Fat Thickness and Ribeye Area, I. Assessment of Technician Effect on Accuracy*
5. *Evaluation of Ultrasound Measurement of Fat Thickness and Ribeye Area, II. Repeatability of Measurements.*
6. *Use of Ultrasound Backfat Estimates to Form Marketing Groups Prior to Finishing for Feedlot Steers*
7. *Using Real-Time Ultrasound During the Feeding Period to Predict Cattle Composition.*
8. *Prediction of Carcass Traits Using Live Animal Ultrasound*

B. Directed toward ultrasound and beef industry professionals and/or feedlot managers, seedstock producers, and cow/calf producers (if interested)

1. *Ultrasound applications in beef cattle carcass research and management*
2. *Roundup 1997: KAES Report of Progress 784*
3. *Roundup 1998: KAES Report of Progress 808*
4. *Roundup 1999: KAES Report of Progress 833*

II. Published Informative Articles on the Ultrasound Industry and Technology and/or the Beef Industry (with regards to use of ultrasound)

a. Understanding the Ultrasound Info Craze
b. Live Cattle Ultrasound: Can It Benefit You?
c. Brave New World
d. Live Cattle Ultrasound and the Canadian Beef Grading System
e. Maximizing Net Return
f. Merial Announces Marketing Relationship With CUP Lab
g. Ready, Set, Sort!
h. Service, Service, Service
i. Under The Skin
j. Using Carcass Data
k. Scanning Into the Future

III. Ultrasound Data Documents (Record Sheets)

a. Chute Order Recording Form (CORF)
b. Universal Bull Test Barnsheets
c. Universal Herd Barnsheets
d. Electronic Weights Form

IV. Statistical and EPD Reports (plus explanatory documents)

a. Ohio Bull Test EPDs
b. 2004-2005 Ohio Bull Test Carcass Ultrasound Report: Junior Angus Test Group
c. Sitz Angus Ranch Bull Sale Catalog: Lots 1-15
d. R.A. Brown Ranch 2004 Sale Catalog: Definitions & Explanations of EPDs (Using the Tools in Selection)

There are noticeable differences in the articles that can be seen in the language used and the aspects of emotion (pathos), logos (reason), and character (ethos), depending on their classification and/or intended audience. In articles that belong to the research report category, information is directed toward ultrasound and beef industry professionals and/or related research scientists. Language is used that is heavily laden with carcass ultrasound and beef industry terminology and statistics. There is less emphasis on emotional appeal and a greater focus on reason, so the pathos elements represented are lesser and greatly overpowered by logos within the documents. Occasionally, these articles may be of interest to feedlot managers, seedstock producers, and cow/calf producers; thus language may be less technical and more influential emotionally.

In published informative articles on the ultrasound industry and technology, and/or the beef industry (with regards to the use/benefits of ultrasound), although being directed to any interested parties within both industries, some may find the presented information more useful than others (depending on level of knowledge and education). As so, there are language variations depending on the intended audience; terminology and language tends to be more descriptive and has greater emotional influence in order to appeal to a wider audience.

The carcass ultrasound record sheets contain terminology common to the beef industry, therefore understandable by all or most individuals within the entire beef industry. However, individuals in the ultrasound profession (technicians)

may enter data and other information in the documents using terminology and abbreviations unfamiliar to those outside the field of beef carcass ultrasound. Following completion of data entry, the intended audience is strictly the ultrasound field technician and employees of The CUP Lab; therefore technician, producer, ultrasound image, and animal information must be clearly defined in order to maintain consistency, accuracy, and integrity.

Statistical and EPD (Expected Progeny Difference) Reports contain terminology and information understandable by most individuals in the carcass ultrasound profession and the beef industry; however, they are generally tailored to appeal to cow/calf producers and seedstock producers (breeders), as these are the ones to use the data in making informed decisions regarding their production systems. With the inclusion of explanatory information and definitions, any interested party can be educated on the terminology used in these documents.

LITERATURE REVIEW

In order to further understand the discourse of the beef carcass ultrasound profession, three documents were analyzed more closely. These included a published informative article entitled *Understanding the Ultrasound Info Craze* by Patrick Wall; and two carcass ultrasound record sheets during a scanning session, namely the *Chute Order Recording Form* (CORF) and the *Universal Herd Barnsheet*. (See Appendix)

The published informative article entitled *Understanding the Ultrasound Info Craze* was written by the Director of Communications at The Centralized

Ultrasound Processing Lab, who is also a certified ultrasound lab and field technician. It is a descriptive educational document meant to inform individuals unfamiliar with the carcass ultrasound profession about the scanning procedure, traits measured, and their subsequent value and importance to them as members of the beef industry. It applies all aspects of persuasion in order to evoke a response from the reader. The article informs the reader of carcass ultrasound's usefulness within a production system and the beef industry; why it is of benefit to them in terms of making informed decisions and progressive marketing strategies regarding their operation; and evokes a sense of responsibility in the reader as to their importance and value in the beef industry.

The *Chute Order Recording Form* (CORF) and the *Universal Herd Barnsheet* are two equally important documents whose value cannot be overlooked in the carcass ultrasound profession. Since barnsheets and paperwork cause the most variation in time spent per herd, it is the technician's responsibility to educate the producer and oversee completion of paperwork. The CORF communicates the order of scanning and includes pertinent information regarding the technician, producer, scan session, and animal. This information must accurately correspond with the ultrasound images taken during the session in order to prevent confusion and/or errors during data interpretation and maintain accuracy. All included document information and data entered communicates important facts that are critical for objective, accurate review and interpretation as certain factors regarding environmental or animal condition can influence ultrasound image quality. The *Universal Herd*

Barnsheet contains technician, customer, and detailed animal and management information important for data interpretation in order to prevent misrepresentation and maintain accuracy and integrity. After evaluation and interpretation, pertinent animal information and ultrasound data results are released to the beef producer or breeder (seedstock producer) and representative breed association.

It is by the included document information and correct data entered that accurate results can be reported so that progressive steps can be made within the beef industry.

PERSONAL INTERVIEWS

In order to be successful in promoting the ultrasound and livestock industries, one must be successful in educating and communicating with individuals and groups associated with these industries on the benefits of ultrasound and its application in beef cattle production. Patrick Wall, Director of Communications, and Mark Henry, Director of Operations for The National Centralized Ultrasound Processing Lab & Technology Center (CUP Lab), work with a variety of people in many different areas of the livestock business on a day to day basis. Although both are certified ultrasound lab and field technicians, and spend approximately half of their day interpreting ultrasound images, or occasionally teaching ultrasound training courses, each individual has an area of expertise and focus based on their position with the company.

From my interviews I learned that ultrasound industry professionals use many types of communication media, dependent upon the audience to be informed and the purpose of what needs to be conveyed. Mark Henry, being Director of Operations, has a more company-focused basis for communication media, writing meeting reports, information request responses, proposals, budget reports, and marketing plans. Having to interact with more individuals in executive or administrative positions, his means of communication tends to be more formal.

On the other hand, Patrick Wall, Director of Communications, has a responsibility to interact and communicate with more individuals outside the company, interacting with people from various areas of the livestock and ultrasound industries with different levels of education. Therefore, Patrick writes a monthly newsletter, as well as informative articles, to educate individuals on the ultrasound industry, its benefits in livestock production, and to inform people as to what is happening at the CUP Lab.

Similarly, both Mr. Henry and Mr. Wall write memos and letters as part of their company positions, in addition to using email, phone, or speaking as means to communicate with people. Each individual uses the appropriate media for the intended purpose, depending on the projected audience, information to be conveyed, urgency, and the formality of the situation. In order to promote and grow the ultrasound business and use of ultrasound technology, it's critical to educate and inform all people associated with the beef industry as to its benefits and potential for bettering the United States and world beef supply.

CONCLUSIONS

In the process of research for my report, I found that communication within the field of beef carcass ultrasound is extremely important in making progressive steps in the beef industry. The ability to adapt discourse practices to various audiences is necessary for educational and informative purposes. It is by the accuracy and authenticity of the content of these documents that allow for the valuable application of the technology within beef production systems.

REFERENCES

Berkenkotter, C., & Huckin, T.N. (1995). *Genre Knowledge in Disciplinary Communication: Cognition/Culture/ Power*. Hilisdale, NJ: Lawrence Erlbaum Associates, Publishers.

Borg, E. (2003). *Discourse Communities*. ELT Journal Volume 57/4. Oxford Press.

Cattle Network. (2005, May). *Merial Announces Marketing Relationship With CUP Lab*. Retrieved July 17, 2005 from http://www.cattlenetwork.com/content.asp?contentid=4944

Centralized Ultrasound Processing Lab. (2005). *Beef Cattle Real Time Ultrasound Training Manual.* Walter & Associates, LLC.

Delehant, T. M., Dahlke, G. R., Hoffman, M. P., Iiams, J.C., Rouse, G.H., Wilson, D.E. (1997). *Using Real-Time Ultrasound During the Feeding Period to Predict Cattle Composition.* A.S. Leaflet R1433. Iowa State University- Department of Animal Science. Retrieved July 15, 2005 from http://www.extension.iastate.edu/Pages/ansci/beefreports/asl-1433.pdf

Gordon, K. (1999, March 1). Service, Service, Service. *BEEF*. Retrieved July 14, 2005 from http://beef-mag.com/mag/beef_service_service_service/index.html

Greiner, S.P., Rouse, G.H., Wilson, D.E., Cundiff, L. (1996). *Predicting Beef Carcass Retail Product Using Real-time Ultrasound and Live Animal Measures: Progress Report.* A.S. Leaflet R1327. Iowa State University-Department of Animal Science. Retrieved July 15, 2005 from www.iowabeefcenter.org/Pages/ansci/beefreports/asl-1327.pdf

Hassen, A., Wilson, D.E., Rouse, G.H., Trenkle, A., Willham, R.L., Beliele, D., Crawley, C., Iiams, J.C. (1996). *Evaluation of Ultrasound Measurements of Fat Thickness and Ribeye Area, I. Assessment of Technician Effect on Accuracy*. A.S. Leaflet R1329. Iowa State University- Department of Animal Science. Retrieved July 15, 2005 from http://www.extension.iastate.edu/Pages/ansci/beefreports/asl-1329.pdf

Hassen, A., Wilson, D.E., Rouse, G.H., Trenkle, A., Willham, R.L., Beliele, D., Crawley, C., Iiams, J.C. (1996). *Evaluation of Ultrasound Measurement of Fat Thickness and Ribeye Area, II. Repeatability of Measurements*. A.S. Leaflet R1330. Iowa State University- Department of Animal Science. Retrieved July 15, 2005 from http://www.extension.iastate.edu/Pages/ansci/beefreports/asl-1330.pdf

Huston, J., Jansonius, H., Schmidtberger, W., Staab, P., Woydziak, M., Lumpkins, M., Stremel, A. (1997, April). *Roundup 1997: KAES Report of Progress 784.* KAES Contribution No. 97-335-S. Kansas State University- Agricultural Research Center - Hays. Retrieved July 17, 2005 from http://www.oznet.ksu.edu/library/lvstk2/srp784.pdf

Iiams, J.C., Trenkle, A. (1997). *Use of Ultrasound Backfat Estimates to Form Marketing Groups Prior to Finishing for Feedlot Steers*. A.S. Leaflet R1430. Iowa State University- Department of Animal Science. Retrieved July 15, 2005 from http://www.extension.iastate.edu/Pages/ansci/beefreports/asl-1430.pdf

Ishmael, W. (2000, April 1). Brave New World. *BEEF*. Retrieved July 14, 2005 from http://beef-mag.com/mag/beef_brave_new_world/index.html

Jansonius, H., Schmidtberger, W., Staab, P., Woydziak, M., Graham, C., Lantow, D. (1999, April). *Roundup 1999: KAES Report of Progress 833*. KAES Contribution No. 99-378-S. Kansas State University- Agricultural Research Center - Hays. Retrieved July 17, 2005 from http://www.oznet.ksu.edu/library/lvstk2/srp833.pdf

Jansonius, H., Schmidtberger, W., Staab, P., Woydziak, M., Lumpkins, M., Stremel, A., Tonroy, N. (1998, April). *Roundup 1998: KAES Report of Progress 808*. KAES Contribution No. 98-340-S. Kansas State University- Agricultural Research Center - Hays. Retrieved July 17, 2005 from http://www.oznet.ksu.edu/library/lvstk2/srp808.pdf

Kester, W. (1999, April 1). Under The Skin. *BEEF*. Retrieved July 14, 2005 from http://beef-mag.com/mag/beef_skin/index.html

Peck, C. (2000, Sept. 1). Ready, Set, Sort! *BEEF*. Retrieved July 14, 2005 from http://beef-mag.com/mag/beef_ready_set_sort/index.html

Porter, J.E. (1986). Intertextuality and the Discourse Community. Vol. 5, No.1. Rhetoric Review.

Rouse, G., Greiner, S., Wilson, D., Hays, C., Tait, J.R., Hassen, A. (2000). *2000 Beef Research Report: The Use of Real-Time Ultrasound to Predict Live Feedlot Cattle Carcass Value*. A.S. Leaflet R1731. Iowa State University- Department of Animal Science. Retrieved July 15, 2005 from http://www.extension.iastate.edu/Pages/ansci/beefreports/asl1731.pdf

Roybal, J. (1998, March 1). Maximizing Net Return. *BEEF*. Retrieved July 14, 2005 from http://beef-mag.com/mag/beef_maximizing_net_return/index.html

Saskatchewan Agriculture and Food. (1995). *Live Cattle Ultrasound and the Canadian Beef Grading System*. Government of Saskatchewan. Retrieved July 17, 2005 from http://www.agr.gov.sk.ca/DOCS/livestock/beef/marketing/ultrasound.asp?firstPick=&secondpick=Beef&thirdpick=Marketing

Strohbehn, D. ((2001, Feb. 15). Using Carcass Data. *BEEF*. Retrieved July 14, 2005 from http://beef-mag.com/mag/beef_using_carcass_data/index.html

Vogel, K.J., Wilson, D.E., Rouse, G.H., Minick, J.A., Tait, J.R., Kruser, J. (2002). *2002 Beef Research Report: Usefulness of Cross-Sectional Image to Predict Intramuscular Fat for Feedlot Application Using Real-Time Ultrasound.* A.S. Leaflet R1771. Iowa State University- Department of Animal Science. Retrieved July 15, 2005 from http://www.extension.iastate.edu/Pages/ansci/beefreports/asl1771.pdf

Wall, P. (2005, July). *Understanding the Ultrasound Info Craze*. The Centralized Ultrasound Processing Lab & Technology Center (CUP Lab).

Williams, A.R. (2000). *Live Cattle Ultrasound: Can It Benefit You?* Publication 2253. Mississippi State University Extension Service. Retrieved July 14, 2005 from http://msucares.com/pubs/publications/p2253.pdf

Williams, A.R. (2002). Ultrasound applications in beef cattle carcass research and management. *Journal of Animal Science*, 80(E. Suppl. 2):E183–E188. Retrieved July 17, 2005 from http://www.asas.org/jas/symposia/esupp2/jas2278.pdf

Wilson, D.E., Rouse, G.H., Graser, G.H., Amin, V. (1998). *1998 Beef Research Report: Prediction of Carcass Traits Using Live Animal Ultrasound.* A.S. Leaflet R1530. Iowa State University- Department of Animal Science. Retrieved July 15, 2005 from http://www.extension.iastate.edu/Pages/ansci/beefreports/asl-1530.pdf

Wilson, D.E., Rouse, G.H., Hays, C.L., Tait, J.R., Kruser, J. (1998). *Scanning Into the Future.* ASB 1998:DEW-417. Iowa State University- Department of Animal Science. Retrieved July 17, 2005 from http://www.cuplab.com/pdf/12ScanFuture.pdf

APPENDIX

Understanding the Ultrasound Info Craze

By Patrick Wall
Director of Communications
The National Centralized Ultrasound Processing Lab & Technology Center
(CUP Lab)

Even though ultrasound technology and its application to the beef industry is still in its "calf" stage, the demand for carcass information is growing and maturing rapidly. With each breed association reporting ultrasound data and carcass EPDs independently, comparing the numbers becomes difficult and extremely confusing. In response to countless requests from breeders and buyers alike, a grass-roots explanation of ultrasound data as it is collected "chute-side" is long overdue. A step-by-step description of each image collected is a good method to help beef producers understand the traits measured and how to incorporate them into selection programs, regardless of breed or background, farm or feedlot.

Percent Intramuscular Fat (%IMF) or Marbling

With all of the grid premiums and incentives to raise Choice and Prime cattle, it's easy to see why so much selection pressure has been placed on marbling. The section header implies that the two traits are one in the same. In reality, %IMF is simply an indicator trait for marbling, much like Birth Weight EPD is an indicator of calving ease. With high marbling EPDs and carcass quality genetics demanding top dollar in the sale ring, it is extremely important producers understand what they are buying.

The major difference between %IMF and marbling is that %IMF is a numerical objective measure, whereas marbling is subjective to the eye of the grader. The correlation is usually around +.70 between the two measures. In order to accurately predict USDA marbling score using ultrasound, the same grader would need to be used for every research trial. As a result, a chemical extraction procedure was adopted, using the percentage of intramuscular fat in the ribeye muscle. The collection of %IMF values comes from taking a thin slice of the ribeye in the cooler. External and seam fat are removed from the sample. The steak is then frozen, ground up, and ether extract analysis determines the fat percentage from a sub-sample of the ribeye.

This method captures saturated and unsaturated fat cells, both of which contribute to the eating experience of the consumer. USDA Graders can only measure fat or marbling they can see when assessing quality grade. Typical chain speed in a harvest facility often does not give ample time for some fats to "bloom" or whiten before the carcass is stamped for quality.

Ultrasound machines show intramuscular fat by "hearing" a density change and portraying it on a screen as a grayscale color change. Lean tissue has a different density than fat, thus allowing us to estimate the amount of fat vs. lean on a percentage basis. As a result, the prediction models developed to estimate %IMF in seedstock do just that; they do not attempt to mirror any USDA grader. To classify and compare the actual IMF value is extremely

difficult. A bull with a Birth Weight EPD of -1.5 is often termed a "Calving Ease Sire" with little to no argument. However, a bull with a high Marbling or %IMF EPD cannot necessarily be called a "Prime or High Choice Sire," but merely a bull with good carcass quality genetics.

The most confusing element of understanding ultrasound data is deciphering which unit of measure is actually under your nose, especially in the case of marbling vs. %IMF. As one can see in the table (Courtesy of Iowa State University, Department of Animal Science), the number scale for Percent Intramuscular Fat and Numeric Carcass Marbling Score is close, but not one in the same. There is no written law or breed association rule that defines how %IMF or marbling is published in either sale catalogs or advertisements. When data is sent out from The CUP Lab to a breed association or breeder, it is in %IMF form, simply an average value taken from 4-5 images per animal. Complex computer models estimate the percent of intramuscular fat within a box placed by the interpreting technician in a consistent spot between the 12th and 13th ribs in the image, reported to the nearest hundredth. Some breeds express the EPD in %IMF fashion, but others convert the measure to Numeric Marbling Score units in order to…prevent confusion.

% IMF	Quality Grade	Marbling Degree	Marbling Score
2.3-3.0	Select -	Slight 00-40	4.0-4.4
3.1-3.9	Select +	Slight 50-90	4.5-4.9
4.0-5.7	Choice -	Small 00-90	5.0-5.9
5.8-7.6	Choice o	Modest 00-90	6.0-6.9
7.7-9.7	Choice +	Moderate 00-90	7.0-7.9
9.8-12.1	Prime -	Slightly Ab 00-90	8.0-8.9
12.2+	Prime o	Mod Ab 00-90	9.0+

When purchasing bulls or heifers, keep in mind that sale catalogs may express marbling or %IMF in any of the columns presented in the table, not to mention additional data for EPDs and Ratios.

Along with this, breeders may also adjust bull ultrasound data to a "steer equivalent." This attempts to give bull buyers information on how they can expect feedlot calves from a particular bull to grade, offsetting the testosterone effect known to be detrimental to a bull's marbling. If all breeders used the same adjustment, data would be easier to compare. Unfortunately, a variety of unpublished math problems get used. Some use a base adjustment, for instance +2.0% IMF, which may overestimate the genetic ability of the poorest bulls to grade and undersell the top-end genetics. Others may multiply the actual %IMF or the age-adjusted values. If you are unclear if the data in front of you has been adjusted and to what extent, consult the breeder for clarification. Remember, the bull sale you attend first may differ from the one just down the road or the one you catch via satellite or video auction. Breed association websites, journals, and sire summaries are often good "rainy day" sources to help eliminate some of the confusion.

Ribeye Area (REA) and Rib Fat

The most difficult image to interpret at the CUP Lab is also the most troubling for technicians to collect on the animal. The margin for error when collecting the REA image is extremely small for both lab and field technician alike, especially when the breeder remembers by heart how big the full sib's ribeye measured a year ago. Consequently, the lab takes more calls from breeders with dissatisfied results, even though the ratios and sire rankings may mirror a year ago. I'm still waiting for my first call complaining about ribeyes that traced too big. Understandably, the only live animal measure of muscle currently available is REA, especially important to breeders marketing terminal sires and retail product genetics. From a lab interpreter's perspective, we only trace what we can see, and guesswork more often underestimates the animal's genetic merit for muscle. As a result, more missing data comes back to the breeder in the REA column than any other, but poor quality images create poor quality results.

At the CUP Lab, highly trained and certified technicians trace every animal's ribeye by hand. A computer mouse is used to trace the boundaries of the *longissmus dorsi*, or ribeye muscle; the computer measures the amount of area within the boundaries drawn, reported to the nearest tenth of a square inch. If the interpreter cannot see the boundaries needed, the image is rejected and no REA is reported, even though Rib Fat can still be measured. Again, data is NOT adjusted as it leaves the CUP Lab; most associations use their own breed-specific age adjustment before sending data on to the breeder. Other associations are still working to compile enough data to develop accurate age adjustments for ultrasound traits. Consult your breed association representative to be sure the data you are receiving has been age adjusted. If the data you are receiving is in its raw form, compare the REA value against the animal's unadjusted scan weight, or in a REA/cwt format. Selecting bulls for muscle using unadjusted or raw REA data could mislead one into choosing the oldest animals instead of the heaviest muscled.

Ribeye Area is not only used for the obvious REA EPD, but also incorporated into corresponding Yield Grade and Percent Retail Product EPDs. Rib Fat has substantially more influence on either of the retail yield EPDs and is also measured on the same image as REA, though much easier to interpret at the lab. Rib Fat is measured in the same location for both ultrasound and carcass data collection, at the ¾ position (3/4 the distance of the entire ribeye muscle starting from the spine or medial edge) perpendicular to the muscle. A computer mouse is used to measure the distance from the hide-fat interface to the fat-lean interface, reported to the nearest hundredth of an inch. The accuracy of ultrasound rib fat vs. fat measured on the actual carcass has been questioned. However, there is equal argument that ultrasound may actually be more accurate than the carcass measure. Hydraulic hide pullers found in most commercial packing plants often remove external fat with the hide, a source of variation eliminated when using ultrasound.

Breeders must toe a fine line when utilizing fat and retail product EPDs in their selection program, not only from a breeding perspective, but also matching the body composition of their cow herd to their particular management and environmental resources. On the average, Fat EPD in most all breeds has stayed near zero, though significant genetic variation within the population and/or breeds is quite evident. The reason is quite simple; select

against fat and you run the risk of indirectly affecting the breeding/re-breeding rate (stayability) and milking ability of your cow herd. Select for increased fat, and you subject your calf crop to potential yield grade discounts and inefficient gains. The optimum combination of quality and yield for your customers may vary from what your cow herd can effectively produce. Mating a beef cow that adequately maintains herself on the feeds and forages you have available with a bull that provides the carcass ammunition desired by your customers is a key element to success.

Rump Fat

Many cattle producers question the usefulness of a rump fat measurement for the simple fact that grids neither pay nor discount for the trait. Besides, the image takes more time to collect and requires additional preparation (clipping/oiling) of the animal. However, the value of the trait is well documented, though not referred to nearly as often as the more traditional measures of carcass cutability.

On the surface, rump fat is extremely easy to collect and highly repeatable. The reference point needed to measure the trait uses the *gluteus medius* and the *biceps femoris*, two muscles easily identified in the ultrasound image taken over the rump. The hook bone is simple to palpate, a landmark used by field technicians to make rump image collection almost effortless. Rump fat depth is measured at the CUP Lab by physically dragging a computer mouse from the hide-fat interface to the reference point between the previously mentioned muscles, reported to the nearest hundredth of an inch.

Agreeably, very few breeders select bulls or replacement heifers based solely on rump fat, but its genetic merit warrants a deeper explanation. Rump fat by nature is an early developing tissue. Early texts of beef cattle anatomy often refer to it as the "breeding pad," a protective fat Mother Nature put in place for mating, making the process more "comfortable" for both bull and cow alike.

Since scanning age windows are open only to cattle near a year of age, an early developing fat tissue helps breeders recognize cattle with more "fat potential." As one might expect, earlier maturing cattle lay down the breeding pad at a younger age. Thus, noticeable differences exist among breeds and biological types, particularly British vs. Continental breeds. Obviously, saying that Charolais cattle average less rump fat than Herefords is not reinventing the wheel, but using growth trends on rump fat vs. rib fat will help producers better understand how to effectively utilize the trait.

On a ration that meets or exceeds nutritional requirements, cattle will naturally have more rump fat than rib fat at yearling. However, on a high-energy diet, like in a feedlot situation, rump fat and rib fat measures come together, and in some cases, the measures actually cross (more rib fat than rump fat) as the animal nears harvest. Seedstock may do the same if being "pushed" to achieve maximum performance.

In the end, British breed associations may find rump fat to be more useful in predicting retail product since more genetic variation is expressed. Continental breeds often find that rump fat is not statistically significant in retail product prediction because the measure more closely mirrors rib fat. Regardless, rump fat may still be used to identify potentially lower maintenance animals within a contemporary group. Similar to rib fat, rump fat needs to be

maintained and controlled. Progress can be made in retail yield, but extreme selection pressure could harm reproductive traits. USDA Graders take a quick look at the rump to see if a yield grade adjustment is necessary as the carcass rolls by on the chain. I would suggest breeders do the same when examining their genetics for retail product, especially if heifers are retained in the operation or sold as replacements.

The evolution of ultrasound in the beef cattle industry is a rather short history lesson. Its acceleration into mainstream seedstock and commercial selection programs is a testament to the usefulness of ultrasound data for cattle operations of all sizes and scopes. The science and technology behind ultrasound is not perfect, but it has established itself as the most cost-effective and accurate tool to assess carcass composition in beef cattle without sacrificing the animals themselves. The growth EPDs developed and established in the 80's and 90's helped the beef producer compete in a performance driven market. Ultrasound data is again helping the beef business to compete, domestically and globally, in a value-based market driven by the taste buds of the consumer.

Customer Member Number: _____

HERD BARNSHEETS

Customer Name: _____

Customer Address: _____

_____

Scanning Technician: _____

Animal Identification Information:

Herd Number		Birth Date	Dam Tag	Scan	Scan	Scan	Group	Test	Scan		
Tattoo	Sex	Registration No	Registration No	Wt	Wt Date	Date	Code	Type	Sex	Diet	Remarks
M 330 3300	B	1/31/02 XYZ123	123 123456789	1230	1/01/03	1/01/03	A	R	B	2	Example Animal

TEST TYPE:
R, RANCH TEST
C, CENTRAL TEST
D, DEVELOPING HEIFER
F, FEEDLOT

DIET:
0, UNKNOWN
1, 0% CONCENTRATE
2, <= 50% CONCENTRATE
3, >50% CONCENTRATE

Group Code - Breeders are to use a single digit letter (A, B, C, etc.) group code to distinguish how the animals listed on this barnsheet are to be grouped into contemporary groups. Only animals that are reared together and managed in the same manner (diet, health practices, etc.) are to be in the same contemporary group.

Diet - A diet consisting of 0% concentrate contains no grain. Animals on pasture, and perhaps supplemented with hay, are on a 0% concentrate diet. Whole plant corn silage, without the addition of more corn or other grains, would describe a 50% concentrate diet. f the whole plant corn silage diet was also supplemented with hay, then the diet would be <= 50% concentrate. A whole plant corn silage diet supplemented with corn or other grains would be >50% concentrate. An earlage diet would be approximately a 75% concentrate diet.

Chute Order Recording Form (CORF)

Technician Information

Name:_____ Equipment Serial No.:_____

Breeder Information

Name:_____ Address:_____

Association(s):_____ City, State & Zip:_____

Member Code(s):_____ Phone Number:_____

Email address:_____ Fax Number:_____

Scan Session Information

Scan Date:_____ Clipped-Blown-Both:_____

Disk ID:_____ Comments:_____

	Tattoo*	Weight or birthdate if duplicate tattoo	Herd Prefix	Comments (breed & breeder if not the same as above)		Tattoo*	Weight or birthdate if duplicate tattoo	Herd Prefix	Comments (breed & breeder if not the same as above)
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

*** All duplicate tattoos must be clearly defined**

Walter & Associates, LLC; P.O. Box 627; 413 Kellogg; Ames, IA 50010 - ph. (515)232-9442 - fax (515)232-9578 - cuplab@cuplab.com